SFUND RECORDS CTR
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FINAL
RECORD OF DECISION
FOR
OPERATING INDUSTRIES, INC.
SUPERFUND SITE
MONTEREY PARK, CALIFORNIA

Volume 2

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Contents

Acronym List

ARARs	applicable or relevant and appropriate requirements
BTEX	benzene, toluene, ethylbenzene, and xylene
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
DTSC	California Department of Toxic Substances Control
EPA	Environmental Protection Agency
ft/day	feet per day
ft/yr	feet per year
gpm	gallons per minute
HELP	Hydrologic Evaluation of Landfill Performance model
hp	horsepower
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
mg/L	milligrams per liter
MOC	USGS Method-of-Characteristics code
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OII	Operating Industries, Inc.
OSWER	Office of Solid Waste and Emergency Response
PCB	polychlorinated biphenyl
PCE	perchloroethylene
ppm	parts per million
RCRA	Resource Conservation and Recovery Act of 1976
ROD	Record of Decision
SCAQMD	South Coast Air Quality Management District
TBC	to be considered
TCE	trichloroethylene
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
USGS	U.S. Geological Survey

Part II
Responsiveness Summary

This section presents Environmental Protection Agency's (EPA's) responses to the written and oral comments received at the public meeting and during the public comment period. Comments were received from individuals, an interest group, public entities, and the Operating Industries, Inc. (OII) Steering Committee of potentially responsible parties who have entered into settlements with EPA. The section is divided into responses to written comments and responses to oral comments. Comments are expressed in italics; EPA's responses in plain text.

Responses to Written Comments

This section provides responses to written comments that EPA received during the public comment period. Responses are divided into the following categories: individuals and interest groups, public entities, and the OII Steering Committee.

Responses to Comments from Individuals and Interest Groups

Comments were received from Hank Yoshitake, RK Brown, Manuel M. de la Puente, Terry DeWolfe, LASER "Landfill Alternatives Save Environmental Resources," Tsutomu Thomas Odajima, and R. William Robinson. Responses to these comments are provided below.

Yoshitake Comment. *After studying EPA's Fact Sheet #24, I made comments at the June 12, 1996 community meeting in Montebello and recommended Alternative #3 over EPA's Alternative #2. Thinking that the sooner OII is cleaned up the better, I based this recommendation on the figures given on page #11 where the estimated volume of constituents removed would be 2 1/2 times greater with Alternative #3. Since speaking with some of your staff members and engineers from the City of Montebello, I found that this figure, if attained, would be approximately only 17% of the total. $39 million dollars could be put to better use for other areas of the cleanup.*

Therefore, as an interested resident, I wish to concur with EPA's preferred Alternative #2.

EPA's Response. EPA agrees with this comment. EPA determined that Alternative No. 2 protects human health and the environment. EPA analyzed Alternative No. 3 to determine if it would provide significant benefits over Alternative No. 2. This did not turn out to be the case. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires that cost be considered in terms of additional benefits provided. As Alternative No. 3 did not provide significant benefits, but costs substantially more than Alternative No. 2, EPA selected Alternative No. 2 as the remedy. As a note of clarification, the amount of leachate targeted for extraction under Alternative No. 3 represents only 13 percent of the estimated total volume of

leachate in the landfill and 76 percent of the estimated portion of the leachate that is extractable. The increased net present worth cost in going from Alternative No. 2 to Alternative No. 3 is $31 million.

RK Brown Comment. *I attended the community meeting (June 12, 1996) for the above referenced proposed plan. I observed the attempt by the project staff to convince the attendees from the community the EPA's Preferred Alternative No. 2 that only utilizes Perimeter Liquids Controls should be their individual preference or choice. The presentation did not convince the audience. In my opinion as one who has been involved with many environmental situations the EPA staff was an actual hindrance in the attendees' effort to fairly evaluate all of the alternatives outlined by the EPA personnel present. During the straw vote at the end of the meeting I did not observe any attendee indicate approval of the Perimeter Liquid Control Alternative (No. 2). In contrast all of the community residents I could observe did indicate their approval of Alternative No. 3 Perimeter Liquids Control Plus Source Control. As for myself my initial review of Fact Sheet No. 24 led me to favor Alternative No. 4. However the presentation of the EPA Staff and your answers to questions switched my opinion to accept the view of the attendees from the community that Alternative #3 should be adopted by the EPA.*

I believe the EPA regulations concerning the Record of Decision process allows for the adoption of an alternative other than the EPA's project staff preferred alternative. Alternative No. 3 also meets all of the minimum requirements for a final remedy, has community support, and could reduce the time period for cleanup in my opinion. I want a quick solution so, if it does not work, modifications can be made. In private industry in this country the public wants results either to show in the current quarter or in the next quarter's financial results at the latest. To me it is only common sense that any liquid removed from the toxic pile (landfill) will not be there in the future to even be subject to future actions. Thus each gallon removed is one less gallon to be considered as a potential gallon that could flow offsite in future years. With the removal of a significant amount of liquid from the landfill, the hydraulic pressure will be reduced and cleanup will only be quicker in my opinion. Therefore it is my request the EPA adopt an augmented Alternative No. 3 that removes any liquid currently in the Operating Industries Landfill as quickly as possible as the final remedy. Both perimeter and source wells will be needed. Thus I express my desire that the level of onsite efforts be increased and the Record of Decision be prepared to reflect the desires of the community and my belief that a cleanup is quick if both perimeter and source wells are utilized.

EPA's Response. Community acceptance is identified in the NCP as a modifying criterion to be considered in remedy selection. As such, it is considered very carefully by EPA. Numerous parties from the community expressed support for Alternative No. 3 because they believed that this alternative would provide for removal of all or most of the liquid waste from the landfill and that the alternative would reduce the time required for cleanup. However, only a small percentage of the liquid waste could be removed. The vast majority of the liquid waste and all of the solid waste would remain onsite. Because removing all of the waste would be impossible, protection of human health and the environment must be accomplished by

preventing releases at the perimeter. Alternative No. 2 protects human health and the environment by preventing releases that would cause groundwater to exceed drinking water standards. Alternative No. 3 does not significantly enhance prevention of release at the perimeter of the landfill or speed cleanup, but costs considerably more than Alternative No. 2.

EPA's evaluations do not indicate that there would be a reduction in overall remediation time under Alternative No. 3. Based on evaluation of information gathered from the landfill (as described in Appendix F of the Feasibility Study Report), EPA identified areas in the landfill that are potentially saturated with liquids. These potentially saturated areas indicate the potential presence of approximately 870 million gallons of leachate in the landfill. From a thorough review of available data on extraction of leachate from landfills, EPA estimates that only about 17 percent of the total volume of leachate could be removed through extraction wells. The remaining would stay absorbed in the waste or be trapped due to capillary attraction. It should be noted that no amount of pumping or feasible technology could remove the remaining 83 percent of the leachate.

Although 17 percent of the leachate could be removed, EPA targeted the 13 percent that presents the greatest potential threat to groundwater (i.e., the leachate that could potentially migrate to the landfill perimeter) for removal under Alternative No. 3. This means that under Alternative No. 3, approximately 757 million gallons of leachate would remain in the waste prism. Even with leachate extraction, there would still be migration towards the perimeter of the landfill. Although the remaining leachate would presumably be less mobile because the readily extractable portion would have been removed, there would always be a large volume of residual leachate in the landfill that could potentially leak out. Thus, the perimeter liquids control system would still need to be in place and operating as the landfill continued to settle and decompose.

Under Alternatives No. 2, 3, and 4, the perimeter liquids control system would remain as the primary means of preventing migration of landfill contaminants to groundwater. The perimeter system is intended to provide control in all locations and depths where contaminants are leaving the landfill at concentrations in excess of performance standards. Removing 13 percent of the leachate from the landfill would likely reduce the volume of liquids that reaches the perimeter system, but would not significantly improve the effectiveness of perimeter control. Offsite groundwater would still be reduced to cleanup standards by cutting off the contaminant source and allowing natural attenuation to continue to reduce contaminant concentrations in groundwater. Alternative No. 2, the selected remedy, does not preclude removal of leachate from the waste prism, which may be undertaken if it would make perimeter control more effective, reduce cleanup time, or reduce cost.

In summary, EPA has carefully evaluated Alternative No. 3 and concluded that while pumping 13 percent of the leachate would reduce the volume of leachate within the waste prism, the pumping would not significantly enhance protection of human health and the environment.

Thus, Alternative No. 3 would not be substantially more protective than Alternative No. 2, nor would it reduce the cleanup time over Alternative No. 2.

De La Puente Summary Comment. *Our Preferred Alternative. Alternative #3, by incorporating source control, has considerable more merits and better probability of success in containing landfill liquids. The incorporation of source control is practically the only difference between Alternatives #2 and #3. An aggressive program of liquid extraction from the landfill prism seems to be the only way to decrease the time aquifers will remain contaminated. The contamination of the 55 active production wells existing within a 5 mile radius of the landfill seems to be unavoidable in a not so distant future, if the free liquid content of the landfill is not extracted now.*

Arguments and Comments. The arguments and comments in favor of Alternative #3 refer to the underground water contamination issue only. We are in agreement with the rest of the remedy program and grateful for the steps being taken to resolve this crucial problem for our communities.

Our arguments in favor of Alternative #3 are supported by information and facts gathered from your "Feasibility Study Report for OII Landfill Superfund Site Monterey Park, California" of March 1996 and your Facts Sheet #24.

EPA's Response. Please see the previous response to RK Brown's written comment for details on EPA's evaluation of Alternative No. 3. As described in Section 6 of the Feasibility Study Report, EPA does not believe that Alternative No. 3 offers measurable benefits over Alternative No. 2 in providing containment of landfill liquids. Also, as described in Sections 5 and 6 and Appendix H of the Feasibility Study Report, there is no difference between Alternatives No. 2 and 3 in the time that it takes to reduce offsite groundwater contamination to below cleanup standards.

As described in the Feasibility Study Report, modeling (please see response below regarding modeling) indicates that, even under the no further action alternative (Alternative No. 1) without perimeter liquid control, organic constituents would not be expected to migrate more than several hundred feet beyond their current location (which is generally less than 500 feet from the landfill perimeter). This is because natural attenuation processes such as biodegradation, sorption, and dispersion are effectively reducing organic contaminant concentrations. This conclusion is supported by existing groundwater monitoring data, which confirms that organics are generally not present at the fringes or the monitoring network.

Although there are currently maximum contaminant level (MCL) exceedances of inorganic constituents at the fringes of the monitoring well network, the concentrations are generally fairly low. This is the current situation without the benefit of the selected remedy for perimeter control. Through perimeter liquids control, Alternative No. 2 will prevent contamination from entering the groundwater at levels that cause the groundwater to exceed drinking water

standards. There is currently insufficient contaminant mass existing in the aquifer units in the OII Site vicinity to impact drinking water wells in the Central and San Gabriel Basins. Further, recharge to the basin aquifers from the foothills (where the OII Site is located) is a relatively small percentage of the total groundwater in the basins. Thus, even if the current levels of inorganic contaminants observed at the fringes of the monitoring well network were to reach the basin aquifers (assuming a worst case scenario with only dilution and no other natural attenuation processes occurring), the possibility of observable impacts is negligible. In conclusion, with a perimeter liquids control system installed, OII Site-related contamination could not impact a drinking water well in either the San Gabriel or Central Basins.

De La Puente Comment No. 1. *Final Remedy Performance Standards. According to Fact Sheet #24, pg. 7, "The Record of Decision will specify performance standards that the selected remedy must attain, rather than prescribing the specific components of the remedy..." In the same page, under Groundwater Monitoring and Natural Attenuation, continues, " If monitoring shows that natural attenuation is not occurring as anticipated in a particular area, the groundwater contamination will be evaluated to see if more aggressive cleanup measures are needed (Emphasis added). This is a reassuring statement, but it has a serious weakness. It implies that the magnitude of the problem can be fully evaluated in a few years and then take action. The time required to evaluate the full impact of deep underground water contamination and be able to determine if perceptible attenuation is taking place seems to be far beyond the time required to take remedial action.*

EPA's Response. The magnitude of the problem has already been evaluated, and the extent of groundwater contamination has been delineated. Ongoing monitoring, now and in the future, will detect changes in offsite contaminant concentrations. The slow rate of contaminant migration allows routine groundwater monitoring to provide plenty of early warning (many decades) before there could possibly be a significant impact in the drinking water aquifers of the Central and San Gabriel Basins.

De La Puente Comment No. 1 (cont.). *Our main concern is underlined by the magnitude of the data we are dealing with: The toxic liquids deposited in the landfill are measured in hundreds of millions of gallons, the contamination in micrograms/liter, calendar time in hundred of years. It is under this frame of mind that the problem should be considered and action be taken to remedy the situation.*

The main point we are trying to demonstrate below is that aggressive action (Alternative #3) needs to be taken now, due to the fact that neither expectancies of contamination attenuation nor perimeter containment of landfill liquids are being proven with any degree of credibility in your feasibility report.

EPA's Response. Existing groundwater data demonstrate that natural attenuation processes active in the landfill vicinity are having considerable impacts on contaminant migration at the OII Site. For example, around the southwestern perimeter of the South Parcel, there are high

concentrations of several organic constituents. However, these same constituents are either not detected or are found at very low concentrations downgradient of the perimeter. This likely indicates that organic contaminant concentrations are being significantly reduced by natural processes moving away from the landfill perimeter.

Reliable perimeter containment can be achieved through readily available existing technologies (e.g., groundwater extraction wells or an extraction trench/barrier wall). Although perimeter control may be somewhat challenging in the siltstone units around the southwestern perimeter of the South Parcel, a properly designed perimeter system will be able to control landfill liquids. If the perimeter liquids control system cannot provide control, additional contingency measures would be implemented.

De La Puente Comment No. 2. *Risk In the lower right corner of Facts Sheet #24, page 3, there is an insert: "A Word About Risk." This insert misses the point entirely. The risk we are concerned with is not the present health risk to people in Montebello or Monterey Park due to underground water contamination. It is clear that this risk is negligible, because nobody is exposed to these waters now or in a near future. The risk we are concerned with is the probability of a contaminated underground plume reaching vital aquifers systems in the Valley and producing a catastrophic, irreversible contamination in a not so distant future. Considering a large time scale, the probability for this event to occur is high, if no action to debilitate the plume is taken now (See 4. - Groundwater Contamination Attenuation). Alternative #3 addresses this issue. The contamination of the San Gabriel Valley aquifers is a legacy of unforeseeable consequences that surely we don't want to leave to future generations.*

EPA's Response. As described above in EPA's response to the De La Puente Summary Comment, with effective perimeter control and groundwater monitoring, there is essentially no chance that contamination from OII Site will impact drinking water aquifers in the basins. The contamination in the existing plume could not significantly impact current drinking water supplies, as natural attenuation will reduce contaminant concentrations to below levels of concern before they reach the supplies. Therefore, EPA strongly disagrees with the statement that there is a high probability of contamination reaching the aquifers of the Central and San Gabriel Basins. EPA's preferred remedy takes action against the offsite "plume" by cutting off the migration of any additional contaminants to the groundwater from the landfill, thus allowing natural attenuation to work more effectively than it currently is to reduce contaminant concentrations to the cleanup standards. The progress of natural attenuation will be monitored to ensure that contaminant concentrations are being reduced. The intent of the insert in the fact sheet was to make sure that all in the community were aware that no one is being exposed to groundwater contaminated by the OII Site.

As stated above in EPA's response to the De La Puente Summary Comment, EPA does not believe that Alternative No. 3 enhances cleanup of offsite groundwater contamination over Alternative No. 2.

De La Puente Comment No. 3. *Containment of landfill liquids. The perimeter containment described for the preferred solution (Alternative #2) seems to be adequate for leachate and shallow underground water. The information in your report clearly indicates that there are serious doubts the perimeter containment is sufficient for underground water protection.*

EPA's Response. Alternative No. 2 provides perimeter control for all impacted groundwater, regardless of depth. For example, the West Aquifer, one of the deep aquifers (approximately 280 to 300 feet below ground surface) along the western perimeter of the South Parcel, is an area planned for perimeter control at the landfill perimeter under Alternative No. 2. EPA believes that perimeter systems can establish appropriate control in all areas, as discussed above. EPA does not agree that Alternative No. 2 is not sufficient for groundwater protection in deeper zones.

De La Puente Comment No. 3. (cont.) *Supporting Information.*

Feasibility Study, page 5-34
"...The maximum depth to which an extraction trench can be practicably built appears to be no more than 80 feet below ground surface (or less). In areas where leachate migration has been detected at greater depths, the extraction trench would need to be supplemented or replaced by extraction wells."

Feasibility Study, page 2-34
"Groundwater is approximately 15 to 20 feet deep along the perimeter of the South Parcel. It appears likely that shallow groundwater is in contact with a portion of the waste prism in this area."

Feasibility Study, page 2-5
"More than 300 million gallons of liquid are recorded as having been disposed between 1976 and 1983... Liquid wastes were reportedly disposed at the landfill prior to 1976, but records were not kept by landfill operators."

Feasibility Study, page 5-45
"In Alternative #3, leachate extraction would occur within the waste prism to reduce or eliminate liquids that are currently migrating or are expected to migrate towards the perimeter of the site and potentially cause additional groundwater contamination. By removing the liquids from the interior of the landfill, they will be intercepted before reaching the perimeter control system." (Emphasis added).

Feasibility Study, page 5-45
"...seven potentially saturated zones (all on the South Parcel) were identified for leachate extraction. The seven zones were combined to make a total of five extraction areas."

Feasibility Study, Table 5-8
"Total approximate volume of extractable leachate: 113,320,000 gallons."

EPA's Response. The quoted text reflects EPA's intention to control perimeter liquids in deeper areas, as needed, using technologies appropriate to the task. The objective of Alternative No. 2 is to prevent the migration of contaminants from the landfill to groundwater. The technologies assumed for perimeter control include a gravel extraction trench in some of the shallow areas and groundwater extraction wells in deeper and other areas. These are proven technologies. In addition, all aquifer units where contaminants could migrate away from the landfill are being monitored and will continue to be monitored.

De La Puente Comment No. 4. *Groundwater Contamination Attenuation. Contamination attenuation means that the concentration of organic and inorganic compounds contaminating the underground water will decrease, given enough time. Organic compounds will decompose to harmless forms. Inorganic compounds will remain underground, but, hopefully, dispersion will decrease the concentration. In either case the concentration will decrease, if no more new contamination arrives.*

The possibility of contaminating the production wells in the Valley depends mainly on two variables:

a) Time it takes the contaminated water to reach the underground well
b) Time it takes the contaminated water to attenuate

Obviously if the contaminants in the underground plume attenuate before reaching the wells, there will be no problem. To get a rough idea of the wells' contamination probability, we compared estimated traveling and attenuation times.

Traveling times
To get an idea of the order of magnitude of these times, we made several assumptions. We assumed that the distance the contaminated water has to travel to reach the wells is three times the minimum distance of two miles. We also assumed that the linear velocities reported in the feasibility study can be considered average velocities. In reality velocities will vary with the cross section of the aquifers and other factors.

Table 2-6 reports several groundwater linear velocities in ft/day. We took three of the larger velocities reported, two in the NW and one in the E direction to get a feel of the order of magnitude of the time it would take to reach the wells. Results are an indication that the 6-mile route could be traveled in two or, maybe, three decades.

These numbers are only a rough indication of the order of magnitude expected, but the distinct possibility that the contamination could occur is a sufficient argument on behalf of taking an

aggressive action now to try to avoid it. It is clear that the contaminated plume will reach the production wells in spite of the uncertainty in determining when this event will occur.

EPA's Response. With perimeter liquids control, EPA's analysis does not support the conclusion that landfill-related contaminants will reach current production wells. Further, required monitoring would detect any such threat decades before it could possibly occur. As noted in Section 5 of the Draft Remedial Investigation Report (EPA, 1994c) and Section 2 of the Feasibility Study Report (EPA, 1996), some of EPA's estimated groundwater flow velocities may be artificially high. These values are not likely representative of groundwater flow over longer distances away from the landfill. In addition, groundwater flow gradients (which directly impact velocity) decrease towards the Central and San Gabriel Basins. More importantly, contaminants do not migrate at the same velocity as the groundwater. Movement of contaminants is reduced through a number of natural processes such as retardation, dispersion, and biodegradation. The modeling performed to evaluate natural attenuation provides estimates of the maximum distance that groundwater contaminated above MCLs will travel beyond the current extent of contamination. These results are discussed in the following EPA response.

De La Puente Comment No. 4 (cont.). *Attenuation times. To be able to compare traveling times to attenuation times, we consulted Table 6-1, "Approximate Times to Reach Remedial Goals." This table gives attenuation times of 12 to 43 years with an average of 26.2 years for organic constituents. For inorganics, it reports 56 year attenuation times to reach acceptable limits in the Northwest area and 150 years +/- 50 years for the Southwest Area. Even though the report clearly indicates that these numbers can be in great error, it seems obvious that the underground waters will still be contaminated when they reach the active production wells.*

Conclusion
The conclusion from this exercise is that traveling times and contamination times are of the same order of magnitude in several cases for organic compounds, and attenuation times for inorganics are considerably higher. The probability of toxic organic compounds reaching the well is high. The probability of toxic inorganic compounds reaching the wells is practically certain.

Supporting Information
Feasibility Study.- Appendix H Natural Attenuation Evaluation

"It should be noted that because of the complex subsurface conditions, the approximate nature of the model and the hydrological parameters used, none of the results presented in this appendix should be construed as accurate predictions of future contaminant migration...(Emphasis added)

The modeling effort is intended only to provide a solid basis for comparing the relative impact of natural attenuation on groundwater contamination between the various alternatives."

Feasibility Study, Page B-171 and Fig. B3-26
"There are 55 active production wells within a 3-mile radius of the landfill; no active wells are within a 1-mile radius from the landfill, and only 13 are within 2 miles. "

Feasibility Study, Page B-172
"The City of Monterey Park operates three artesian wells (2875B, 2875D, and 2885) for dewatering the groundwater table, located approximately 1 mile northwest of the landfill. The water produced from these wells is discharged directly into the storm drain system. According to the Los Angeles County Department of Public Works records, several wells that previously existed in the vicinity of the landfill (within 1.5 miles) have been abandoned and destroyed."

EPA's Response. EPA's modeling performed in support of the natural attenuation evaluation, described in Appendix H of the Feasibility Study Report, provides estimates of the maximum distances beyond the landfill boundary that contaminated groundwater (above the MCLs) could potentially be observed. Because of the uncertainties associated with predictions made by models in general, a somewhat conservative model that likely over-estimates travel distances was chosen to allow for error on the side of caution. Under Alternatives No. 2 and 3, the modeling indicates that organic constituents will not travel more than 200 feet beyond the current extent of organic contamination (about 800 feet from the landfill boundary). The modeling indicates that inorganic constituents would not travel more than approximately 1,000 feet beyond the current extent of contamination (about three-quarters of a mile from the landfill boundary). This would still be more than a mile from the nearest downgradient production well. Although the estimated travel distances are not expected to be precise predictions of contaminant movement, they are likely in the approximate range of potential migration. As noted previously, the modeling was somewhat conservative and is likely to give upper-bound estimates, especially for inorganic constituents. Thus, if anything, the modeling may somewhat overestimate potential contaminant migration. Monitoring will be performed to determine whether migration and natural attenuation are proceeding as expected.

De La Puente Comment No. 5. *CERCLA Requirements. Alternative #3 complies better than Alternative #2 with the nine CERCLA requirements listed in Fact Sheet No. 24.*

Requirement #9, Community acceptance, was demonstrated by a show of hands, requested by Monterey Park Councilman Alonso, at the community meeting. The overwhelming majority voted for Alternative #3.

EPA's Response. As noted above, EPA considers community acceptance as very important, and seriously considers this factor. It is correct that several community members voiced a preference for Alternative No. 3 at the community meeting. However, other community members and the State of California support Alternative No. 2, as noted in other comments in this Responsiveness Summary and in Part I (Section 7) of this Record of Decision (ROD). In addition, some of the community members who voiced a preference for Alternative No. 3 had

misconceptions regarding how cleanup would progress under Alternative No. 3 and have subsequently changed their position. For example, the City of Monterey Park has expressed support of Alternative No. 2 after discussing the differences between the alternatives with EPA. Alternative No. 3 would not clean up the site faster than Alternative No. 2 and, at best, would provide only a minor improvement in the effectiveness of the perimeter liquids control system, at a considerably increased cost. EPA, therefore, cannot justify choosing Alternative No. 3 over Alternative No. 2. Overall, EPA firmly believes that Alternative No. 2 is the alternative that provides the best balance of the nine Superfund evaluation criteria. Please see the response above to RK Brown for additional detail on EPA's evaluation of Alternative No. 3.

De La Puente Comment No. 6. *Alternative No. 3 Implementation Cost. Capital Cost is listed as $25.6 million versus $17.6 million for Alternative #2. Thirty-Year Present Worth (including Operation) is given as $146 million for Alternative #3 versus $115 million for Alternative No. 2. The incremental cost of Alternative #3 versus Alternative #2 is modest in comparison to the extraordinary contribution it brings to the entire San Gabriel Valley.*

EPA's Response. As described above in the response to RK Brown's written comment (page II-2 of this Responsiveness Summary), because of the large volume of residual liquids that cannot be removed and would remain in the waste prism, EPA strongly believes that Alternative No. 3 does not provide measurable additional benefits for the offsite groundwater contamination (or protection of the San Gabriel Valley) over Alternative No. 2. If Alternative No. 3 did provide a large contribution to cleaning up the OII Site, EPA would agree. Unfortunately, as discussed above, Alternative No. 3 would provide very little benefit at a significant cost.

De La Puente Concluding Comment. *Conclusion. If no action is taken now, the landfill prism will remain a source of underground water contamination for several centuries to come. Only through an aggressive liquid source control, the contamination plume will be stabilized creating preferential paths for the leachate inside the landfill to counteract the tendency to spread outside the perimeter. If aggressive measures are not taken, a catastrophic legacy for generations to come will not be averted.*

When the landfill is finally capped and the thermal destruction unit is in place, we will feel very grateful to the EPA team for a job well done and surely we will breathe cleaner air. But, only if Alternative No. 3 is implemented with an aggressive extraction of landfill liquids can we be sure that we are also helping other generations.

When the entire program is implemented, it will help not only ourselves but others after us. We will not only breathe better, but we all will be able to sleep better.

EPA's Response. EPA agrees that liquid source control is necessary to protect groundwater resources. Alternative No. 2 provides source control at the perimeter. Alternative No. 3 does not remove the source, nor does it significantly enhance perimeter controls. It is correct that the

OII Site (including the landfill contents, landfill gas, and leachate) will remain as a potential source of contamination for a very long time. But, with proper containment, including the landfill cover, landfill gas migration control system, and perimeter liquids control system, no additional releases will occur that represent a threat to human health and the environment. As stated several times throughout these responses, EPA does not believe that Alternative No. 3 offers measurable benefits to offsite groundwater contamination over Alternative No. 2. As noted above in EPA's response to RK Brown (page II-2 of this Responsiveness Summary), Alternative No. 3 would be expected to remove just 13 percent of the total leachate from the landfill. Although this is a considerable volume of leachate (approximately 113 million gallons), Alternative No. 3 would not significantly expedite remediation of the OII Site. The remaining 87 percent of the leachate would remain as a potential threat to offsite groundwater and would still require that perimeter control be in place. Although removing leachate from the landfill prism seems like a good idea, it does not provide substantial benefits to the overall cleanup of the landfill with proper implementation of the perimeter control system.

DeWolfe Comment No. 1. *Given that estimating the potential migration of toxics from the OII Landfill over a protracted period cannot be precise, I have a hypothetical question: If in 10 years or so OII contamination is found in adjacent production wells, will any of the affected water companies or State/County water quality agencies bear any responsibility for not foreseeing this occurrence? In calling around, I find no water master, water quality agency or water company that seems to be involved in evaluating the EPA's leachate extraction options at OII. These would seem to be the people with the expertise to provide a professional assessment of the water contamination risks posed. Have I missed something? Have some of these organizations reviewed EPA's proposal and gone on record endorsing one or more of the EPA identified options?*

EPA's Response. The Water Replenishment District of Southern California, which manages the groundwater supplies in much of the Central Basin including the area closest to the OII Site, has reviewed EPA's plans and provided written comments (addressed below in the section on public entity comments). The Water Replenishment District of Southern California concurs with EPA's selection of Alternative No. 2 and, in their comments, provides some recommendations for implementation of this remedy. In addition, EPA regularly meets with approximately 20 agencies including the State of California Department of Toxic Substances Control and Los Angeles Regional Water Quality Control Board regarding the OII Site. The state is in concurrence with the selected remedy. No agency has indicated it does not support the selected remedy.

The routine groundwater monitoring that will occur as part of this remedy will allow for changes in groundwater quality to be detected long (many decades) before there could be an impact to a drinking water well in either the Central or San Gabriel Basins. If groundwater contamination is spreading further than anticipated or concentrations are not decreasing as expected, EPA will require the parties implementing the remedy to perform additional evaluation to determine if more aggressive action is warranted to address the contaminated

groundwater. If necessary, contingent actions, as described in Section 8 of Part I of this ROD, could be implemented.

DeWolfe Comment No. 2. *My own unprofessional opinion is that this is an instance where any potential miscalculation should be "on the side of caution" - meaning, go with Option 3. The $8 million additional cost of this option over EPA preferred option 2 looms small in Superfund economics relative to the disease prevention security it could represent.*

EPA's Response. EPA agrees that it is appropriate to exercise caution in protecting human health and the environment. EPA's conservative (i.e., cautious) modeling demonstrates that landfill contaminants will not reach production wells. If any miscalculation did occur, groundwater monitoring would detect it decades before a problem would occur. EPA is confident that the preferred alternative, Alternative No. 2, will be fully protective of human health and the environment. The performance standards for both the perimeter control component and the groundwater component are such that the alternative will remain protective as long as the site remains a potential threat to human health and the environment. EPA does not believe that the $8 million in additional capital ($31 million in total net present worth) to implement Alternative No. 3 provides any significant additional protection to human health and the environment. Please see the response to RK Brown above (page II-2 of this Responsiveness Summary) for additional discussion of Alternative No. 3.

LASER (Landfill Alternatives Save Environmental Resources) Comment. *Our review of the past history of Operating Industries Landfill, the past efforts at the landfill Superfund site and the four alternatives proposed by the EPA staff indicated to us the recommended alternative #2 Perimeter Liquids Control is unacceptable as cleanup cannot be expected for 150 years and does not get at the source of the problem. It is only common sense to immediately remove liquids from the areas of the landfill that contain materials in a liquid form. Thus, we request the EPA adopt alternative #3, Perimeter Liquids Control Plus Source Control.*

We note that any liquids removed from the toxic pile cannot in the future migrate off site to increase pollution off site. We understand that by pumping enough liquids at the source one can create a groundwater depression under the landfill. If this occurred, the current flow of liquids offsite would end and with such reversal of the groundwater gradient, the liquids currently offsite might flow back towards the perimeter well line. Computer modeling can be used to show that this could happen when very large amounts of liquids are removed from the landfill. We suggest Alternative #3 be expanded to include such large source removal, since if such a strategy is employed, clean-up might occur in less than 50 years. As the landfill is less than 50 years old, what has occurred can be reversed in the same amount of time.

As the current levels of contamination offsite have only occurred during the half century, we have a responsibility to the future generation to correct the problem as quickly as possible. Thank-you for your attention to our suggestions and concerns.

EPA's Response. Establishing hydraulic control to reverse the hydraulic gradient can be an important tool for groundwater remediation and will likely be used at the OII Site (although the ROD allows for other technologies if they provide the same level of protection). Under Alternative No. 2, if hydraulic control is used, it would be established around the perimeter of the landfill in areas where migrating contaminants cause groundwater to exceed performance standards. Once established, the hydraulic gradient would be controlled enough to prevent migration of contaminants. This means that the hydraulic gradient would be reversed in some areas. It may also mean that the areas eventually become dewatered and that a groundwater depression develops. Alternative No. 3 would not cause hydraulic control to be established more rapidly than Alternative No. 2.

As described above in the RK Brown response, Alternative No. 3 would remove only 13 percent of the total volume of leachate estimated to be in the landfill. Pumping within the landfill would not change the groundwater gradient at the perimeter. Because the landfill is at the top of a hill, even without any leachate in the landfill, groundwater flow would tend to be away from the landfill. Even the most aggressive leachate extraction scenario would be able to remove only about 17 percent of the total volume of leachate in the landfill. There are no leachate extraction scenarios or technologies available that would cause contamination to flow back into the landfill allowing the landfill to be "cleaned up" in less than 50 years. The landfill will remain as a potential source of contaminants for a much longer time frame. However, with appropriate containment systems (a landfill cover, landfill gas migration control system, and perimeter liquids control system), the risk of exposure to these contaminants can be effectively eliminated.

Finally, EPA would like to explain what the 150-year cleanup time refers to. This time refers to remediation of offsite groundwater to below cleanup standards. The times estimated for groundwater cleanup range from about 12 years for organic constituents in the area northwest of the South Parcel up to 150 years for inorganic constituents in the siltstone southwest of the South Parcel. These are approximate estimates based on modeling and may be somewhat conservative (i.e., high). The 150-year period does not relate to how long the landfill itself will remain contaminated; this time cannot be readily estimated. As described above in the response to RK Brown, EPA does not believe that Alternative No. 3 provides expedited groundwater cleanup over Alternative No. 2.

Odajima Comment. *I prefer Alternate #3 but accept Alternate #2 for the same reasons people on the floor said at the meeting on June 12, 1996. But the decision seems to depend on the cost and the details of design of the perimeter liquid control.*

I would like to suggest the following details of design:

1. *The extraction trench will cover complete perimeter.*
2. *It will be wide and deep enough to avoid overflow at any location during any rainfall.*

3. *It will have an adequate cover so that even any baby will not fall in, assuming it will be open. If it will be closed, please disregard.*

Our neighbor passed away about two months ago after suffering lung disease for almost a decade. Her husband once complained the foul odor from the landfill, since the odor was daily during early 1980's. The odor stopped, except when the flair failed, after EPA came in. Many thanks to EPA, but our memory is still vivid in us.

EPA's Response. EPA's mandate in Superfund is to protect human health and the environment. The OII Site will be contained to assure that this is done and will be done in such a way so as to assure the safety of the community. The perimeter control system will cover all portions of the landfill perimeter where landfill contaminants have been detected migrating at levels that cause groundwater to exceed drinking water or other health-based standards. There are portions of the landfill boundary that do not show any evidence of contaminant migration and thus do not require perimeter control at this time. If, in the future, additional releases above performance standards are detected around the perimeter, control will be expanded to those areas.

The specific technologies to be implemented will be determined during remedial design. If an extraction trench is used, it would be covered so that no liquids could escape; and there would be no danger of falling into the trench. The possibility of overflow from the trench would be addressed by equipping it with pumps to remove any liquids that entered the trench.

Robinson, Director, Division 4 Upper San Gabriel Municipal Water District Comment. *Please take note of the "rule of unintended consequences" in your analysis and decision in this matter. Alternative 2 may seem favorable to EPA based upon their current analysis of the problem. But if the goal is to minimize the overall long-term cost of the cleanup, including increased assurances, regarding possible unexpected contingencies, then Alternative #3, which includes concerted efforts concentrated upon source control, would gain preference by your agency. Source Control would be enhanced if a cleanup contractor experienced in work with major Oil Companies in searching out and recovery of liquid materials from geological strata were included in your "solution team." Oil Companies specialize in cost-effective recovery of liquid materials from the ground. Perimeter liquids control is short-sighted in this situation if the alternative were pursued to the exclusion of what is most necessary, which is Source Control.*

EPA's Response. Please see the RK Brown response above (page II-2) for discussion of Alternative No. 3. As noted in that response, Alternative No. 2 does not preclude leachate extraction, in conjunction with perimeter liquids control, if it minimizes long-term cleanup costs. Alternative No. 2 does not require this, however.

It should be noted that the selected remedy, Alternative No. 2, does provide for source control by containing contaminants onsite. And, based on EPA's evaluations, Alternative No. 3 does not provide "increased assurances regarding possible unexpected contingencies."

Some of the parties likely to be involved in implementing this remedy are major oil companies. Thus, if the parties decide to implement leachate extraction, these companies should be able to obtain the type of experienced contractor referred to in the comment.

Responses to Comments from Public Entities

Three public entities provided written comments during the public comment period. These are the California Department of Fish and Game, City of Monterey Park, and the Water Replenishment District of Southern California. Responses to comments from each entity are provided below.

California Department of Fish and Game Comment No. 1. *Page A-24 states, "...there is a slight potential for burrowing animals to breach the cover and be exposed to primary sources of contamination."*

The landfill cover should be thick enough to prevent animal contact. Potential burrowers at the OII site need to be identified to ensure that the landfill cover depth is adequate. DFG should be consulted in the design of the cover and on the vegetation to be used in landscaping.

EPA's Response. This ROD does not address the landfill cover, which was selected under a previous EPA ROD. The cover is currently in the initial stages of design. EPA will consider the California Department of Fish and Game comments during landfill cover design.

California Department of Fish and Game Comment No. 2. *Page A-31 states that, "...this Baseline Ecological Risk Assessment does not address the potential for risk resulting from the release of contamination during the implementation of remedial measures."*

Is there a plan in case this happens, and if so, is there a threat of injury to wildlife? DFG can recommend safety measures, in addition to your institutional controls, for the remediation plans to protect state wildlife, biota, and their habitats.

EPA's Response. Health and Safety Plans will be developed to cover health and safety issues during the remedial design phase of the work. Potential threats to wildlife would be appropriately addressed at that stage. EPA will consider the California Department of Fish and Game comment at that time.

City of Monterey Park Introduction Comment. *The City of Monterey Park wishes to take this opportunity to specifically respond to the proposed Final Remedy and predesign work concerning SWEAP and gas collection requirements.*

As always, the City of Monterey Park is concerned that a thorough and full clean-up be achieved, and be achieved quickly due to the dense urban setting that surrounds it. However, we believe that this clean-up objective can be coupled with a process to allow the Monterey Park community to reuse the land in question for the benefit of the entire region. Therefore, our comments are stated in context with the protection of health and welfare, while preserving the ability for redevelopment to benefit all parties involved.

We appreciated the follow-up meeting concerning the Final Remedy. The City believes that the information released during those discussions provides more clarity to the issues and alternatives than the community meeting held on June 12, 1996. With consideration of this new information, the City would support Alternative No. 2. Our support of the preferred alternative is founded on several facts that were presented to us.

EPA's Response. Comment noted. As mentioned in EPA's responses to the following specific comments, this ROD does not address the components called for in the Gas Control and Cover ROD. EPA will consider specific comments regarding implementation of those systems during implementation of that work.

City of Monterey Park Comment No. 1. *Leachate Treatment Plant - The existing Leachate Treatment Plant will not have its current "footprint" enlarged since improvements are basically treatment process and/or piping improvements.*

We have also been told that any underground piping requirements would be configured with input from the City so as to consider future land uses.

Additionally, that significantly improved aesthetic design elements would be configured into the final plan for the existing plant. Our desire is to seek screening and/or modifications so that the Plant would blend in with development of the North Parcel.

EPA's Response. As described in the Feasibility Study Report, EPA believes that the existing treatment plant footprint will be sufficient to handle any minor modifications necessary to treat the liquids collected as part of this remedy. It should be noted that there is always the possibility that changes to the influent quality or to sanitary sewer discharge requirements could result in the need to expand the size of the facility. However, the City of Monterey Park will have the opportunity to comment on any plant modifications as part of the remedial design process.

As for underground piping configuration and treatment plant aesthetics, these are design issues that will be discussed during remedial design. Again, as will be the case with all significant

design documents, the City will be provided the opportunity to comment on the proposed designs.

City of Monterey Park Comment No. 2. *SWEAP - While not a specific element of the Final Remedy Feasibility Study, the relationship between the Greenwood Avenue Extension, SWEAP and the Final Remedy needs to be closely coordinated so as to ensure duplication is not engaged and that the "Greenwood Avenue" right-of-way extension is maintained as previously requested.*

The Greenwood Avenue has always been seen as a vital link for the North Parcel development for two decades. Additionally, the final extension will provide a critically needed relief for North/South traffic in the region. Currently, Atlantic Boulevard, Garfield Avenue and Paramount Boulevard are bottle-necked during peak traffic hours, causing many delays and compounding the region's air quality problems.

We are also extremely disappointed in recent redesign submittals that show grading associated with Greenwood Avenue being dropped by New Cure. Again, under both the SWEAP and Final Remedy elements, the PRP's will be trenching and performing grading activities in the exact vicinity of the proposed roadway. From a cost benefit view the work is very compatible to the scope required. Therefore, we would urge a rejection of downsizing of the previous design plans.

EPA's Response. EPA understands the City's desires to incorporate the Greenwood Avenue extension into any work along the western perimeter of the South Parcel. As noted in the comment, SWEAP is not addressed under this ROD. The landfill gas control, landfill cover, and surface water management systems associated with the Southwest Early Action Plan (SWEAP) were selected by the Gas Control and Cover ROD. However, the City's comment will be considered during implementation of the SWEAP work.

City of Monterey Park Comment No. 3. *Beneficial Reuse of the South Parcel - In keeping with the "Brownfield" philosophy, we believe there exists many opportunities for the particular land area. This might include a park, golf driving range, etc. We believe the proper planning for any equipment, land use restriction and so forth must be closely coordinated with the City of Monterey Park. Otherwise, unintended actions will eliminate viable options.*

Particular attention must be made to the required "Final Cover." Current proposals only accentuate the pressure of a Superfund site and would create the most severe blighting effect on the region. We realize that certain issues might prevent more conventional attempts to address this problem. However, with involvement of the communities and outside landscape professionals, this site could be dressed up so that it blends with the affected communities.

EPA's Response. This remedy will require institutional controls on property used as a landfill or for site-related facilities to protect human health and the environment. Restrictions on

groundwater use are also required for areas overlying contaminated groundwater. The remedial design will specify the nature of these institutional controls. The City will be provided the opportunity to comment on the institutional controls at that time. As with SWEAP, the landfill cover is not addressed by this ROD. Remedial design is underway for the landfill cover under the Gas Control and Cover ROD. The City is routinely provided with design documents for review and comment through its involvement in the Interagency Committee.

City of Monterey Park Comment No. 4. *North Parcel Reuse - The City of Monterey Park has, on a number of occasions, made clear its belief that economic development is possible. In fact, the City is aggressively pursuing those opportunities at this time. We believe development of the 45 acres will benefit all interested stakeholders. This would mean needed job opportunities to the region while generating new sources of remediation dollars.*

This possibility, however, is dependent on the remediation equipment and facilities being eliminated from this parcel. At a minimum, the placement must be done in conjunction with City input being accepted so as to diminish the impact as much as possible. As we have mentioned earlier, the leachate treatment plant footprint must not be increased. We have also been told that for purposes of preparing the Final Remedy report, it has been assumed that the westerly eight acres would be continued to be fenced off for security. This assumption is extremely detrimental to our vision. Freeway access would be eliminated and valuable land discarded.

Additionally, we believe the six acres in the westerly portion needs to be reconsolidated to the South Parcel. This would place the trash onto one site, reduce the long-term costs relating to the six acres and greatly enhance the Region's ability to consider the highest and best use of the North Parcel.

We have provided other recommendations to the USEPA in recent months that we feel would enhance the marketability of the 45 acres of the North Parcel. Those concerns as well as those contained in this letter will provide for the health and welfare of all communities while providing for the eventual beneficial reuse of the properties.

EPA's Response. Institutional controls will be required for those portions of the North Parcel used as a landfill or for site-related facilities; restrictions on groundwater use will also be required for areas overlying contaminated groundwater. As discussed above, the specific nature of those restrictions will be determined during the remedial design stage. The City of Monterey Park will be given the opportunity to review and provide input on the proposed institutional controls. This area of the property may be put to any future use consistent with controls necessary to protect human health and the environment. The ROD notes that no further action, including institutional or engineering controls, will be necessary for soils in areas that are not used as a landfill. Institutional controls will be required for areas used for site-related facilities.

Consolidation of the waste on the North Parcel to the South Parcel is not addressed by this ROD. If EPA determines that it is appropriate to consolidate the waste, a future decision document would be necessary.

City of Monterey Park Concluding Comment. *In conclusion, we believe that with a vision and some master planning, the OII site could be a remarkable example of EPA's innovative programs. We believe our vision will implement EPA's health and safety obligations, increase land value, bring needed jobs to the region and eliminate a large blighted area from our community. Everyone benefits from this scenario. However, it will take a strong belief in the vision, creativity, cooperation, and a willingness to engage in some dialogue with the long-term interests of our community as the ultimate objective.*

EPA's Response. EPA has been engaged in extensive dialogue with the City of Monterey Park regarding several of the issues presented in these comments. EPA expects to continue these types of discussions throughout the implementation process for this remedy. Input from the local community is always a key factor in implementing a successful solution at any Superfund site, especially one in the middle of a large urban area. EPA welcomes continued feedback from the City as we move towards implementation of this remedy.

Water Replenishment District of Southern California Comment No. 1. *As requested, the Water Replenishment District of Southern California (WRD) has reviewed the subject report relating to the selection and implementation of the Final Remedy at the Operating Industries, Inc. (OII) landfill in Monterey Park. It is our understanding that the feasibility study report addresses air, soil, surface water and groundwater contamination. As an agency dedicated to the protection and management of groundwater supplies to nearly four million people in the Los Angeles Coastal Plain, WRD's primary focus is on those issues related to the final groundwater remedy.*

Based on our review of the subject report and our understanding of the four remedial action alternatives we concur with EPA that Alternative No. 2, Perimeter Liquids Containment, is the most viable and economical groundwater remedy for the OII landfill. We also concur with the concept of a perimeter groundwater/leachate/landfill gas extraction trench system to be installed along the western and southwestern boundary of the South Parcel where the largest concentrations of landfill contaminants and leachate have been encountered.

For the record, WRD does not entirely agree on EPA's position to allow identified contaminants and/or contaminant plumes which presently extend beyond the landfill boundaries to attenuate naturally. However, in light of the complex nature of the geologic conditions occurring beneath and adjacent to the site, it is understood that active offsite remediation such as pump and treat may have only limited effectiveness in reducing contaminant concentrations relative to natural attenuation. In order to compensate for this inherent lack of offsite cleanup capability, WRD requests that EPA consider the following recommendations: (see subsequent WRD comments)

EPA's Response. Comment noted. For clarification, it should be noted that while installation of a perimeter liquids control system along the western and southwestern perimeter of the South Parcel is required, the use of a trench is not a required component of this remedy. EPA assumed this trench technology in its conceptual alternatives; however, the remedy is performance based and does not prescribe technologies. Thus, the parties implementing this remedy will determine during remedial design the most appropriate technologies to be used to meet the performance standards (described in Section 8 of Part I of this ROD). The Water Replenishment District of Southern California will have the opportunity to review and provide input on design deliverables associated with this remedy through its involvement in the Interagency Committee.

Water Replenishment District of Southern California Comment No. 2. *Off-site contaminants and/or contaminant plume areas be aggressively monitored on a quarterly basis to better evaluate contaminant migration and/or attenuation.*

EPA's Response. Monitoring requirements for the remedy are specified in the applicable or relevant and appropriate requirements (ARARs) identified in this ROD (presented above in Section 9 of Part I of this ROD). This ROD requires the parties implementing this remedy to develop a monitoring plan during remedial design. The monitoring plan will be designed to evaluate the effectiveness of the remedy, both at the perimeter and in offsite areas. Water Replenishment District of Southern California will have the opportunity to review and provide input during the development of this monitoring plan.

Water Replenishment District of Southern California Comment No. 3. *Where necessary, additional monitoring wells be installed in those areas where offsite data gaps have been observed and at locations beyond the estimated leading edges of contaminant plumes (e.g., west-southwest of Well OI-46A and OI-35A and south of OI-40 and OI-43A). These additional monitoring wells should also be monitored quarterly to enhance the monitoring effort.*

EPA's Response. EPA anticipates that new monitoring wells will be required to fill data gaps in the offsite plume areas during remedial design and to monitor downgradient of the existing monitoring well network to evaluate the effectiveness of natural attenuation. Again, the specific locations and sampling frequencies for any new monitoring wells will be determined during remedial design and presented in the aforementioned monitoring plan.

Water Replenishment District of Southern California Comment No. 4. *The offsite groundwater monitoring data should be presented and thoroughly evaluated on an annual basis in report form for review by interested parties. The report should contain conclusions and recommendations for optimizing the monitoring well network and for making adjustments as necessary to enhance the effectiveness of the Final Remedy.*

EPA's Response. As stated in the response to Water Replenishment District of Southern California comment No. 2, ARARs identified in this ROD specify monitoring requirements. These requirements include annual evaluation. The specific reporting requirements will be determined as part of consent decree negotiations with the parties implementing this remedy. However, EPA expects that evaluation of the groundwater data as it relates to performance of the remedy will be incorporated into an annual report. EPA will also use the 5-year review process under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 to ensure that the selected remedy remains appropriate and protective of human health and the environment.

Water Replenishment District of Southern California Comment No. 5. *A performance-based contingency plan should govern the implementation of the Final Remedy such that appropriate modifications to the Final Remedy can be made in a timely manner once deficiencies are observed. As envisioned, any deficiencies observed would be reported in the annual monitoring reports, as described previously. Once identified, appropriate modifications to the Final Remedy would be implemented in a time span not exceeding one-year unless the time to perform the actual modification(s) exceeds one-year.*

EPA's Response. As presented in the performance standards discussions in Section 8 of Part I of this ROD, contingency actions are incorporated into this remedy. EPA believes that it would not be appropriate in this ROD to outline schedule requirements for implementing any required contingency actions because of the broad range of potential actions that could be appropriate to differing circumstances (ranging from continued monitoring to focused offsite extraction). Instead, schedule requirements will be determined in the scope of work, as part of a consent decree or unilateral order to perform the work, and/or will be determined during remedial design and implementation.

Water Replenishment District of Southern California Comment No. 6. *In addition to the above comments regarding the implementation of the Final Remedy, WRD has noted several apparent deficiencies in the subject report which are presented below.*

On Page 3-12, Section 3.2.3 "Preliminary cleanup goals are defined as the most stringent concentrations between the risk-based concentrations and chemical-specific ARARs concentrations [i.e., drinking water Maximum Contaminant Levels, MCLs] for each chemical of specific concern, unless there are specific exceptions." However, on Page C-13, Section C2.12 the following is stated, "Because of the complex hydrogeological setting at OII landfill, the minimal risk of exposure, and the limited potential use of the resource, the Record of Decision will likely identify MCLs that exceed background as the concentration limits." Based on the above statements it is not certain as to which preliminary cleanup goal is to be used. However, a review of Table 3-1 (Page 3-14) suggests that preliminary cleanup goals for groundwater are the lower of the "Chemical Specific ARAR" (or, MCL) and the "Risk-Based Concentration." If this is correct, then the statement in Section 3.2.3 is correct and the statement cited above in Section C2.1 2 is incorrect or mis-stated.

EPA's Response. EPA has determined that the Feasibility Study Report incorrectly stated the Preliminary Remediation Goals, both in the text and in Table 3-1. The actual performance standards and cleanup standards selected for this remedy are presented in Table 15 of this ROD.

EPA's intent in the Feasibility Study Report was to identify MCLs as the preliminary remediation goals. If a constituent did not have an MCL, then the Risk-Based Concentration (based on either a cancer risk of 1 x 10^{-6} or a hazard index of 1 for each individual constituent) from Table B6-2 was to be used as the preliminary remediation goal. A corrected version of Table 3-1 from the Feasibility Study Report is included in Appendix C of this ROD.

Water Replenishment District of Southern California Comment No. 7. *Table 3.1 contains various sub-headings (e g., "Chemical - Specific ARAR," "Risk - Based Concentration") for the various environmental media of concern in the subject report. However, for each of these data columns there is no indication of the source(s) of these values (from elsewhere in the report).*

EPA's Response. Table 3-1 in the Feasibility Study Report did not explicitly cross-reference specific concentrations described in greater detail elsewhere in the report. The revised Table 3-1 provided in Appendix C clarifies these cross-references.

Water Replenishment District of Southern California Comment No. 8. *There appears to be a discrepancy between the data presented in Table B6-2 with those presented in Table 3-1. For example, in Table B6-2, it was assumed that the "Selected RBC [Risk - Based Concentration]" for a specific chemical would be inserted into the "Risk - Based Concentration" column in Table 3-1. However, in several cases, (e.g., 4,4'-DDT, Carbon tetrachloride, Chlordane) the "Total RBC Noncancer" value in Table B6-2 was inserted as the "Risk - Based Concentration" for these chemicals in Table 3-1. In addition, in many cases, the "Selected RBC" values in Table B6-2 transferred to the "Risk - Based Concentration" column in Table 3-1 do not coincide due to apparent unit mistransformations. For example, the "Selected RBC" value in Table B6-2 for 1,1,1,2-Tetrachloroethane is listed as 0.68 micrograms per liter (mcg/l); however, in Table 3-1, this value is listed as 0.068 milligrams per liter (mg/l) in the "Risk - Based Concentration" column for the same chemical. It is not exactly known what the source of this error is; however, it may related to the level of "Risk - Based Concentration" selected for this study (i.e., $1x10^{-4}$ or $1x10^{-6}$ risk factor). In either event, certain corrections are warranted to clarify the data in these two tables.*

EPA's Response. Both of the errors mentioned in this comment occurred in compilation of Table 3-1. The corrected table is provided in Appendix C of this ROD, and the actual

performance standards and cleanup standards for the selected remedy are presented in Table 15 in Part I of this ROD.

Responses to Comments from the OII Steering Committee

The OII Steering Committee provided written comments broken up into four categories: comments on alternatives comparisons, comments on the risk assessment, comments on ARARs and a separate report on groundwater exposure pathways. Excerpts from the report on groundwater exposure pathways are included herein. The entire report is included in the administrative record for this remedy. Responses are provided below for comments in each of the categories mentioned above.

Alternatives Comparisons Comment No. 1A. *The impact of Alternative 1 in controlling the migration of landfill liquids and landfill constituents in off-site groundwater is substantially underrated in the FS. For all practical purposes, Alternative 1, which integrates the requirements of CD-3, when fully implemented will be nearly as effective as Alternatives 2, 3, and 4.*

EPA's Response. The commentor, by referring to CD-3 systems, is referencing systems required by the Gas Control and Cover ROD. Alternative No. 1 does not require these systems, nor does it modify them in any way. Alternative No. 1 does assume that the systems required by the Gas Control and Cover ROD will be implemented, however. The commentor is partially correct in that systems required under the Gas Control and Cover ROD can be designed to partially address landfill liquids. Although the gas control systems currently proposed will likely provide partial control of landfill liquids along a portion of the southwestern perimeter of the landfill and thus contribute to this remedy, there are several other areas where these systems will have virtually no impact on contaminants migrating from the landfill to groundwater (i.e., in the northwestern and eastern portions of the South Parcel and in the deeper units in the southwestern portion of the South Parcel). Therefore, EPA strongly disagrees with the assertion that Alternative No. 1 will be nearly as effective as Alternatives No. 2, 3, and 4. The basis for this conclusion is further explained in subsequent responses.

Alternatives Comparisons Comment No. 1B. *The analysis of the performance of Alternative 1 in the FS report assumed that remedial measures associated with this alternative do not provide for a significant control of the migration of landfill liquids at the landfill perimeter, and landfill constituents migration in groundwater from the landfill would continue unabated. Although Alternative 1 does not provide explicit requirements for control of landfill liquids, components of this alternative clearly both reduce the potential for the landfill to generate leachate and control the migration of landfill liquids beyond the Site perimeter to a significant degree. The assumption in the FS that migration continues unabated is incorrect and understates the benefits of Alternative 1, especially related to remedial components of CD-3, which are part of this alternative.*

First, Alternative 1 includes the construction of a cover over the entire South Parcel and the collection, management and discharge of storm water. The cover and storm water management systems minimize infiltration of water into the landfill. The potential to form leachate will be correspondingly and significantly reduced. This reduction will result in a gradual decrease in the amount of free liquids in the landfill. Landfill liquids will be further reduced by the natural biodegradation processes of waste decomposition which consumes water from the landfill. The landfill cover and storm water management systems, therefore, will establish a negative water balance in the landfill, gradually reducing the potential for the landfill to generate leachate.

EPA's Response. EPA believes that the installation of the landfill cover and surface water management systems (which are required by the Gas Control and Cover ROD, not by Alternative No. 1) will not have a substantial impact on migration of landfill liquids from the landfill to groundwater until many years into the future, and will not have a sufficient impact in all areas where contaminants are migrating to groundwater. In addition to the large quantities of liquids within the waste prism, there are substantial amounts of landfill liquids currently along the interface between the landfill and native formations. Further, these liquids are generally at greater depths within the landfill where the ongoing infiltration from precipitation has limited impacts. These landfill liquids will continue to migrate away from the landfill with or without the landfill cover.

Alternatives Comparisons Comment No. 1C. *The FS report attributes most, if not all, landfill constituents in groundwater to leachate. The FS report does not analyze landfill gas (LFG) as a potential source of volatile organics in groundwater. The volatile organics detected in groundwater however, are also typical of LFG. Groundwater in some areas lack significant inorganic contamination (e.g., chloride and Total Dissolved Solids (TDS) that would be present if leachate was the source of contamination. LFG, therefore, must be evaluated as a potential source of volatile organic landfill constituents (i.e., "VOCs") in groundwater.*

The CD-3 activities, which are incorporated in Alternative 1, will control LFG near the landfill boundary. This control will substantially reduce the potential for VOCs in the LFG to partition into groundwater. In wells that are only impacted by LFG, it is expected that additional groundwater control will not be required and Alternative 1 should be sufficient to eliminate any future groundwater contamination consistent with the goal for landfill liquids control. In addition, natural attenuation will remediate any organic landfill constituents currently detected in the groundwater beyond the landfill boundary. Thus, in some areas, extraction wells and the associated piping as provided in Alternatives 2, 3, and 4 to control off-site releases of landfill constituents in groundwater may not be necessary once CD-3 activities are in place.

EPA's Response. Landfill gas requirements are addressed in the Gas Control and Cover ROD, not by Alternative No. 1. EPA disagrees that addressing landfill gas alone will protect groundwater. Further, addressing landfill gas alone would not meet ARARs.

This comment mentions groundwater wells "that are only impacted by landfill gas"; however, there are not any specific wells or areas of contamination presented that the OII Steering Committee feels are directly the result of landfill gas. As discussed in Section 8.5.1 of the Draft Remedial Investigation Report (EPA, 1994c), EPA substantiates its conclusion that virtually none of the observed groundwater contamination at the landfill can be attributed to landfill gas. Thus, control of landfill gas will have negligible impacts on groundwater contamination.

Alternatives Comparisons Comment No. 1D. *Finally, the operation of the LFG recovery system in Alternative 1 will involve the pumping and removal of landfill liquids and groundwater in many areas. Although landfill liquids control is not an explicit requirement of Alternative 1, liquids will be pumped and removed in many areas to maintain the LFG recovery systems operation. Because the LFG recovery system will be constructed and operated in the same aquifer formations and depth intervals that EPA has postulated for the landfill liquids control system in Alternative 2, the pumping of liquids from the LFG recovery system will have the same effect on groundwater levels, as if the liquids were recovered from groundwater extraction wells. Therefore, significant reduction of groundwater elevation and hydraulic control of landfill liquids is anticipated with the implementation of CD-3.*

EPA's Response. Again, landfill gas is not addressed by this ROD. Landfill gas measures are required by the Gas Control and Cover ROD. This ROD requires landfill liquids control. This ROD does not preclude the use of systems designed to meet requirements of both gas control and landfill liquids control.

Alternatives Comparisons Comment No. 1E. *The effectiveness of CD-3 in controlling liquids migration is evident by the recent field testing of the LFG recovery system along the western and southwestern perimeter of the South Parcel. The pumping of liquids from TM No. 12 wells (since December 1995 for Phase I and February 1996 for Phase II wells) has caused the groundwater elevation and gradient in the Pico formation to reduce. A reduced or reversed groundwater gradient will correspondingly reduce or eliminate any groundwater and landfill constituents migration away from the landfill. Although the shallow LFG recovery system in the Lakewood/San Pedro formation has not yet been constructed and tested, similar reductions in groundwater levels and the potential for landfill constituents migration are anticipated.*

EPA's Response. Regardless of the efficacy of systems required by the Gas Control and Cover ROD, a ROD is necessary to require a remedy for landfill liquids and groundwater protection. This ROD requires a performance-based remedy for landfill liquids and groundwater protection.

Outside of a few water-level reductions in isolated depth intervals in certain gas monitoring probes, EPA has not been presented with information to verify that "pumping of liquids from TM No. 12 wells....has caused the groundwater elevation and gradient in the Pico formation to reduce." Based on data presented to date, the Technical Memorandum No. 12 wells do not appear to provide sufficient liquids control to meet the performance standards for the perimeter

control system. If the gas control systems can demonstrate adequate liquids control, then, as discussed above, additional controls would not be required in those areas.

Alternatives Comparisons Comment No. 1F. *The landfill cover and operation of the LFG recovery systems as part of Alternative 1 will clearly reduce the potential for the migration of landfill constituents away from the landfill in LFG and groundwater. Alternative 1 provides substantial control of liquids, and this should be acknowledged in the FS analysis. There is simply no need to construct additional liquids extraction wells in the same locations as the LFG recovery wells. Additional control measures of the types EPA identifies in Alternative 2, therefore, should only require the installation of additional groundwater extraction wells in the areas where the LFG recovery system is not already effectively controlling liquids migration. A decision to install additional extraction wells at the landfill perimeter should be based on an analysis of groundwater elevations and landfill constituents concentrations after a period of continuous operation of the LFG recovery system.*

EPA's Response. As discussed above, EPA agrees that if landfill gas recovery wells meet the performance standards for both RODs, there would be no need to construct additional liquids extraction wells at those locations. However, EPA does not agree that installation of a perimeter control system should be delayed until after "a period of continuous operation of the LFG recovery system" when there is evidence of ongoing, uncontrolled migration of landfill contaminants from the landfill at levels that cause groundwater to exceed performance standards.

Alternatives Comparisons Comment No. 2. *The time-frame to reach ARARs in off-site groundwater for Alternatives 1 and 2 likely is substantially less than estimated in the FS.*

In the FS, EPA estimated the time-frame to eventually reach concentrations at or below ARARs (e.g., MCLs) in off-site groundwater for both organic and inorganic constituents for each alternative. Substantive differences in the approach and assumptions for modeling of organics and inorganic constituents, however, resulted in substantially different estimates of the time-frames to achieve ARARs in off-site groundwater. With regard to organics, EPA's modeling approach began by estimating the chemical mass flux from the landfill necessary to achieve the approximate concentrations of constituents recently detected in groundwater at the boundary of the landfill. This mass flux was then assumed to discharge into groundwater for a period of time from the start of the operations of the landfill in this area until the remedy (e.g., Alternative 2 Perimeter Liquids Control) is implemented, over which time an organic chemical plume in groundwater is assumed to have migrated off-site. This off-site plume established the initial condition for the subsequent modeling of groundwater remediation, i.e., the attenuation and/or removal of organic constituents from groundwater after each alternative is implemented. The resulting off-site organic plume naturally attenuates through dilution, dispersion, retardation, and biodegradation. In Alternative 4, off-site groundwater removal by pumping was also modeled by EPA. EPA's modeling approach for organics, although not fully calibrated to the available off-site groundwater quality data, is conceptually consistent with the

available information on the groundwater systems and observed groundwater quality trends at the OII Site.

EPA's modeling of organics in the FS indicates that the concentration and location of organics constituents in groundwater are already nearly stable and with the implementation of either Alternatives 1 or 2, only limited additional organics migration would be expected to occur in the future. This plume stability is the direct result of the retardation, and most importantly, biodegradation, which removes organics from groundwater and offsets any further significant migration.

Although the same approach used by EPA to model organics in groundwater in the FS is also conceptually appropriate to model inorganics, a fundamentally different approach was used by EPA to "calibrate" and model the migration of inorganics. In this case, the concentration of antimony in groundwater, which EPA selected as the inorganic modeling parameter for the FS analysis, was first assumed to be equivalent to the maximum concentration detected in each model segment along the landfill boundary. Antimony was also assumed to be present throughout the entire off-site groundwater zone extending, for example, approximately 1,000 feet from the edge of the landfill in the southwest area. The concentration of antimony in off-site areas was assumed to decrease smoothly from the edge of the landfill, to a lower concentration approximately equivalent to the MCL at the outer edge of the modeled areas. This continuous distribution of antimony contamination was then assumed to establish the "initial" conditions for the inorganics modeling. EPA's assumed distribution of antimony was not calibrated to off-site groundwater quality data to reproduce the actual contemporary antimony concentrations observed in off-site monitoring wells.

The groundwater monitoring data at the OII Site are completely inconsistent with EPA's assumed initial distribution of antimony in the FS, particularly in the southwest area, where the largest estimated times to clean up inorganics in groundwater occur. Antimony has not been detected in many of the monitoring wells along the western and southwest edge of the OII landfill. Even when antimony was detected, these detections were frequently followed by many other samples in which antimony was not detected in the same well. The use of a maximum value to initialize the inorganics model in any single well, much less over an entire perimeter, is clearly inconsistent with this sporadic, unverified pattern of detection. A similar pattern of sporadic detection exists in off-site wells, where antimony is detected in some wells (e.g., OI-34A, OI-35A, OI-40A) only one time, at concentrations below quantitation limits, and subsequently was not detected in any other samples from the same wells. In other off-site wells in the southwest area (e.g., OI-14A, and OI-36A), located within the assumed area of initial off-site contamination, antimony has never been detected. This clearly suggests that the OII landfill would be only a minor source of antimony, and antimony is highly variable in time and spatial distribution over the modeled area. Antimony is clearly not present throughout the entire off-site area at the concentrations and mass assumed in the FS model for inorganics. The modeling approach for inorganics adopted by EPA in the FS vastly overstates the initial mass of antimony in groundwater that must be attenuated or removed.

Antimony is not the most appropriate "representative" constituent for use in modeling inorganics as a class of constituents in groundwater at the OII Site. As discussed above, antimony has not been detected and verified to be present in groundwater in the vast majority of off-site wells. The same sporadic unverified patterns of detection of antimony in the above mentioned off-site wells are exhibited in groundwater from background wells such as OI-10B and OI-44A. Because these wells are upgradient from the OII Site, the antimony detections must be naturally occurring or sampling-induced artifacts. Corresponding patterns of antimony detections in downgradient wells, therefore, are also likely naturally occurring, or artifacts, and do not support a conclusion that there has been any significant migration of antimony in groundwater southwest of the landfill, much less the widespread migration assumed in the FS model.

Antimony has not been routinely detected, and verified to be present in off-site groundwater in the southwest area at concentrations above the MCL or that would pose any health risk in water supplies. Even if the antimony detections in off-site wells are real, and representative of groundwater quality, the sporadic detections of antimony do not allow for the careful calibration of a groundwater flow/contaminant transport model to reproduce the current extent and distribution of contamination because the actual concentration of antimony cannot be established by such sparse data. If a model can not be shown to accurately reproduce the present, which should be described by actual monitoring data, it can not be relied upon to accurately forecast the future for any period of time, much less for over 100 years, as the FS attempted to do. Although EPA has recognized in the FS the potential uncertainties in the use of models to forecast the future, noting that "none of the results...should be construed as accurate predictions of the future," it nonetheless has relied on a model of antimony to conclude that Alternative 2 will result in MCL exceedances in off-site groundwater for a period of over 100 years after the final remedy is implemented, and Alternative 1 will never achieve ARARs for inorganics over an increasing larger area of off-site groundwater. These conclusions are not supported by the groundwater quality data; and moreover, antimony clearly is not the most appropriate inorganic constituent upon which to base such long-range predictions.

A sensitivity analysis of the potential time and distance over which the inorganic plume would spread before reaching MCLs was presented in the FS as a basis for alternative comparisons. The sensitivity analysis, however, only considered the groundwater seepage velocity and the starting distribution of antimony as sources of uncertainty in the modeling. Unlike the analysis of organics, the inorganic analysis in the FS did not consider attenuation mechanisms such as retardation or complexing/precipitation as a source of uncertainty. These processes are described in EPA's Draft Remediation Investigation report (1994) as likely affecting constituent mobility and concentrations, and could slow down and stabilize the inorganic plume in the same manner as was modeled for organics. As a result, EPA's modeling analysis for inorganics in the FS represents a worst-case, upper-bound estimate of cleanup times for Alternatives 1 and 2, particularly in the southwest area, and substantially overstates the actual time to cleanup groundwater for inorganics.

An alternative modeling analysis of groundwater cleanup times for inorganics in the areas southwest of OII was prepared by ENVIRON and, previously presented to EPA in January, 1996. ENVIRON's analysis of inorganics was based on arsenic, which has been consistently detected along the edge of the landfill and in some off-site wells (e.g., OI-34A). A similar conceptual modeling approach was used by ENVIRON to initialize the mass of arsenic in groundwater as was used by EPA in the FS for organics (i.e., by calibrating the groundwater flow and contaminant transport processes separately to reproduce current-day groundwater quality at the edge of the landfill, and in off-site areas). But, like the FS, ENVIRON's analysis did not consider removal processes (e.g., complexing/precipitation) for inorganics. ENVIRON's analysis was, therefore, conservative and produces an upperbound estimate of cleanup times. ENVIRON's analysis demonstrates that the estimated time to achieve ARARs (e.g., MCLs) for arsenic, as a representative inorganic constituent in off-site groundwater, is much smaller than estimated for antimony in the FS, and is approximately 50 years for Alternative 2. The actual time to achieve concentrations of inorganic constituents less than ARARs in off-site groundwater for Alternative 2 is only approximated by ENVIRON's model, but is certainly much less than estimated in the FS and may be about the same as was estimated of organics (i.e., no more than 50 years).

As discussed in the prior comment, the FS ignores the impact of groundwater pumping and control of landfill liquids under CD-3 for Alternative 1, even though pumping of liquids will be required to operate the LFG recovery system. In fact, the future concentration of landfill constituents in off-site groundwater under Alternative 1 should be substantially less than currently exists, and should eventually reach health-based cleanup goals and MCLs in most areas. The future impact of Alternative 1 on off-site groundwater concentrations can be established by implementing the LFG recovery system, including the associated liquids control system, and observing the effect on groundwater levels (over the near term) and groundwater quality (over the longer term).

EPA's Response. As noted in the Feasibility Study Report, antimony was selected as a representative inorganic constituent for the modeling and evaluation of natural attenuation. The initial distribution of antimony used for the modeling was intended to be representative of the approximate observed extent and magnitude of inorganic contamination in the different areas (southwest and northwest) and was not intended to mirror the observed extent of antimony. The commentor is correct in pointing out the variable detections of antimony in the offsite areas. This is the case for several of the inorganic constituents. That is why a representative distribution was modeled, rather than trying to replicate the exact distribution of any one constituent. Antimony could have been replaced by any number of metals, and the simulation results presented in the Feasibility Study Report would not change. EPA believes that the modeling performed for the Feasibility Study is not a "worst-case, upper-bound estimate of cleanup times." However, it is somewhat conservative and closer to an upper bound estimate. It was intended for and is adequate for comparison of alternatives. The estimated times and distances to reach MCLs are expected to be in the general range of contaminant behavior.

Monitoring plans to determine the effectiveness of the remedy will be developed during the remedial design process. Additional evaluations that reflect the shorter cleanup times identified by the commentor would be appropriate to incorporate in such plans to measure the progress of remediation.

EPA agrees that under Alternative No. 1, groundwater concentrations will "eventually reach health-based cleanup goals and MCLs." As discussed in the ROD, the time required to reach cleanup goals under this alternative cannot be reliably forecast, but is certain to be many decades longer than Alternative No. 2. This is because contaminants will continue to migrate from the landfill to groundwater for many decades until the source is depleted. EPA believes that such uncertain and lengthy time periods to reach MCLs would not be reasonable for groundwater cleanup. Furthermore, Alternative No. 1 does not meet ARARs for landfill closure.

Alternatives Comparisons Comment No. 3A. *The incremental benefit of Alternative 4, in comparison to Alternative 1 and 2, in decreasing the time to achieve ARARs in off-site groundwater is highly uncertain, and potentially de minimis.*

Organic constituents in groundwater at the OII Site have been shown by monitoring to be effectively limited by natural attenuation processes, in particular, retardation and biodegradation. EPA's modeling analysis in the FS indicates that these same attenuation processes will be the primary mechanism for the future removal of organic constituents in groundwater, even if landfill leachate removal and off-site groundwater pumping are provided, as proposed in Alternatives 3 and 4, respectively. The importance of natural removal and attenuation processes is apparent by the fact that the time estimated in the FS to achieve ARARs for organics in off-site groundwater is not materially different, whether or not groundwater is pumped. EPA correctly concludes, therefore, that Alternatives 3 and 4 are no more effective than Alternative 2 in limiting the time to achieve cleanup of organics in off-site groundwater to ARARs.

With regards to inorganics, as described in the previous comment on the FS groundwater modeling, the mass of inorganic constituents in groundwater and the corresponding time to achieve cleanup to ARARs is likely substantially overestimated in the FS, in particular as to Alternatives 1 and 2. The failure to correctly consider the infrequent detection of inorganics (e.g., antimony) when initializing the model, and the lack of consideration of attenuation mechanisms such as adsorption and complexing/precipitation in the modeling approach, suggests that actual time to achieve chemical-specific ARARs in most off-site areas will be substantially less than estimated in the FS. Like organics, absorption and complexing/precipitation mechanisms likely will play a major role, and perhaps the dominant role, in achieving chemical-specific ARARs in off-site groundwater for inorganics in the future.

The importance of attenuation processes in limiting migration of inorganic landfill constituents is evident by the fact that there are few consistent, verified detections of inorganic landfill constituents in off-site monitoring wells southwest of the landfill, even though inorganics are much more consistently detected in monitoring wells at the edge of the landfill in this same area. For example, the groundwater from off-site well OI-34A has been found to contain certain organics and inorganics (e.g., chloride) from the southwest area of the landfill. Groundwater in this well also contains arsenic, although at concentrations below its MCL. ENVIRON's modeling analyses demonstrated that the observed concentrations of arsenic in this well are only possible if arsenic migration is attenuated (in this case by an assumed retardation through adsorption to the aquifer).

Although the presence of organics in OI-34A indicates landfill liquids have already migrated to this area, no inorganic landfill constituents have been detected and verified, to be present in this well at concentrations that exceed MCLs. This fact alone suggests that attenuation mechanisms are already playing an important role, as described in EPA's RI report, in limiting the migration of inorganic landfill constituents in groundwater, and should continue to do so in the future.

EPA's Response. Although EPA acknowledges that estimated times to cleanup are conservative, EPA disagrees with the assertion that the estimated times to cleanup for inorganic constituents in groundwater are likely substantially overestimated in the Feasibility Study Report. EPA does not agree with the statement that "there are few consistent, verified detections of inorganic landfill constituents in offsite monitoring wells southwest of the landfill." Several wells, including Wells OI-29A, OI-32A, OI-40A, and OI-43A, have exhibited consistent detections and MCL exceedances of inorganic constituents over the last several years. Further, arsenic in Well OI-34A exceeded the MCL in the August 1995 sampling event (54.5 ug/L).

Alternatives Comparisons Comment No. 3B. *The effect of such attenuation mechanisms will be to decrease the time to achieve chemical-specific ARARs by natural attenuation processes in off-site groundwater. The times predicted to achieve chemical-specific ARARs for inorganics under Alternatives 1 and 2, which did not consider attenuation mechanisms and assumed an unrealistically large existing mass of off-site contamination, are highly uncertain and probably much less than estimated by EPA in the FS. The actual times to achieve ARARs under Alternatives 1 or 2, which rely on natural attenuation of landfill constituents in off-site areas, may not be substantially different than the 60 years estimated for Alternative 4. Any perceived benefit of Alternative 4 in providing greater reliability (because it is assumed to clean-up groundwater over a shorter time-frame) is, therefore, highly uncertain and potentially de minimis. This uncertainty alone is sufficient to conclude that the substantial additional costs to implement the off-site pump and treatment system in Alternative 4 is unwarranted and inappropriate.*

EPA's Response. As stated in the response to Alternatives Comparisons Comment No. 2 above, the assumed mass of existing contamination was based on the observed extent and magnitude of inorganic contamination in groundwater. Further, any conservative assumptions would impact all alternatives equally; thus Alternative No. 4 would still provide shorter cleanup times. The comment also does not acknowledge the benefits of Alternative No. 4 in preventing further migration of the inorganic area of contamination. For these reasons, EPA disagrees with the concluding statement claiming that uncertainty in the natural attenuation evaluations, alone, renders Alternative No. 4 unwarranted and inappropriate. However, as presented in the Feasibility Study Report, Proposed Plan, and this ROD, based on EPA's evaluation of the nine criteria, Alternative No. 4 does not offer sufficient additional benefits to justify the additional expenditure.

Alternatives Comparisons Comment No. 4A. *Alternative 3 is not demonstrated to be more effective than Alternatives 1 and 2 in limiting the migration of landfill constituents from the landfill into off-site groundwater.*

In the evaluation of the performance of Alternative 3 in Chapter 5 of the FS, EPA states that "through active leachate extraction, there will be a significant reduction of interior leachate volumes." EPA further states that "this would reduce the inherent hazards posed by the leachate." These statements incorrectly overstate the effectiveness of Alternative 3 in reducing leachate in the landfill and, in particular, in protecting the quality of off-site groundwater.

EPA's estimate of the volume of leachate within the "wet and saturated areas within the South Parcel waste prism" amounts to 871 million gallons (see Appendix F of the FS). Of this quantity, only 17% of leachate is assumed by EPA to be "extractable," resulting in 726 million gallons being non-recoverable. Although the assumed volume of extractable leachate seems somewhat high and cannot be verified through any site data, it illustrates nonetheless that the vast majority of the leachate in the landfill can never be recovered by pumping the waste prism. The inability to recover leachate from a landfill is an inherent result of the manner in which landfills are constructed and operated. As waste is buried in a landfill, individual waste cells are capped by placement of daily cover soil. This creates separate isolated cells of waste. Leachate within these cells is hydraulically separated from other adjoining cells such that wide spread continuous pools of leachate which can be pumped over the long term rarely exist. As a result, it is generally infeasible to completely dewater and remove leachate from a municipal landfill. Experience at OII in attempting to pump leachate clearly demonstrates this infeasibility. For these reasons, EPA has not identified dewatering as a presumptive remedy for MSW landfill closure in the FS.

EPA's Response. EPA agrees that Alternative No. 3 is not significantly more effective than Alternative No. 2. EPA also agrees that it is generally infeasible to completely dewater and remove leachate from the OII Site. EPA disagrees with the claim that the leachate at the OII Site is isolated in hydraulically separate cells created by placement of daily cover. While it is true that waste cells can inhibit liquids movement in modern landfills, data developed during

the remedial investigation reveal that this is only partially true at the OII Site. Soil cover will not necessarily keep liquids separate in isolated cells. EPA believes that there are fairly wide spread areas of saturation at the OII Site that could be pumped over long periods. As discussed elsewhere in responses to these comments, EPA believes that extensive leachate removal with appropriate equipment would be feasible.

Alternatives Comparisons Comment No. 4B. *In the evaluation of Alternative 3, EPA has assumed that only 13% of the total leachate (113 million gallons) would be recoverable from the South Parcel. This small amount clearly does not represent a "significant reduction of interior leachate volumes" as described in the FS. Even if this quantity of leachate could be removed from a landfill, implementation of a perimeter liquids control system would still be required to manage leachate and contaminated groundwater already present in the perimeter area and to intercept any liquids that may slowly drain towards the perimeter from the interior of the landfill in the future. In this regard, EPA correctly concluded in the FS that Alternative 3 did not significantly reduce the need or provide a more effective strategy for perimeter control of landfill liquids in comparison to Alternative 2. Alternatives 2 and 3 both rely on natural attenuation of landfill constituents in off-site groundwater, and Alternative 3 is no more effective than Alternative 2 in achieving chemical-specific ARARs in off-site areas.*

The facilities described in the FS to recover leachate in Alternative 3 were estimated based on assumed extraction duration and extraction rates that are not supported by the observed performance of the leachate collection system historically operated at the OII Site. Table 5.8 of the FS provides a summary of the assumed rate of leachate extraction from the trash prism for Alternative 3. The extractable leachate volumes for the North Central, Northeast, Northwest, and Northwest Trench Extraction Areas are not consistent with the observations made in wells, borings and pump tests actually conducted in these areas. Appendix D-11 of the CD-3 Prefinal Predesign Report[1] indicates these areas are generally dry to moist with only thin, vertically disconnected intervals of wet trash. These wet intervals are not continuous horizontally and thus do not form a saturated pool of liquids that can be pumped over the long term. Any wells installed in these areas would be expected to quickly go dry and yield only small volumes of liquid intermittently. The volumes of extractable leachate in the South Parcel is substantially overestimated in the FS.

[1] *New Cure, Inc. Prefinal (90%) Predesign Report, OII Landfill CD-3 Activities.* Environmental Solutions, Inc. February 1996.

EPA's Response. The estimated leachate volumes are based on interpretation of available data as presented on cross sections in Appendixes F and I of the Feasibility Study Report. The data presented on these cross sections are sufficient to justify the estimated volume of extractable leachate. Further, in the Northwest Area, four leachate extraction wells have been operating with continuous pumping for the last several years.

Alternatives Comparisons Comment No. 4C. *The number of wells and duration of pumping to extract leachate from the landfill are correspondingly underestimated in the FS. The average*

pumping rate for leachate wells, including those in the southwest area, is assumed to be 0.5 gpm. This rate is assumed to be sustainable for up to 30 years. Site experience in implementing CD-1 has shown that wells completed in trash in the wetter southwest area initially produce yields of about 0.5 gpm but the yield substantially reduces, in some cases to less than 0.1 gpm within about 1 year. Thus, the assumed extraction volumes in the FS over the stated 30 year time interval is substantially overestimated.

EPA's Response. The Feasibility Study Report (on page 5-46) acknowledges that the long-term extraction rate would likely decrease over time as landfill liquids are removed. As presented in Appendix F (page F-111), for cost estimates, the initial extraction rate of 20.5 gallons per minute (gpm) is only assumed for the first 5 years; over the next 10 years, an extraction rate of 10.25 gpm is assumed; and an extraction rate of 2 gpm is assumed for the last 15 years. It should be noted that none of the existing leachate extraction wells was specifically designed and installed with the intent of maximizing leachate extraction. Thus, data from the existing system are not expected to coincide with the performance of an extraction system that would be implemented under Alternative No. 3.

Alternatives Comparisons Comment No. 4D. *The evaluation of Alternative 3 in the FS also assumes that the extractable leachate can be removed by only 41 wells. This would require that each well be able to remove the extractable leachate from within an area of 2.5 acres on average. Since liquids exist in vertically and horizontally disconnected intervals, leachate recovery wells would likely need to be much closer to effectively implement EPA's proposal to drain the majority of extractable leachate from these areas. As a result, many more leachate recovery wells would need to be operated for a much longer period of time than estimated in the FS to ever hope to recover the leachate EPA assumed to be extractable from the landfill. Alternative 3, therefore, could only be implemented at a substantially greater cost, and reduced performance, than the FS represents.*

EPA's Response. Although it is correct that the Feasibility Study Report assumes the use of 41 wells to remove the extractable leachate, replacement costs for 8 wells (approximately 20 percent of the wells) every year are included in the Alternative No. 3 cost estimate. This well replacement cost would cover installation of new wells in different locations within the assumed extraction areas to replace wells that may go dry. The Alternative No. 3 costs are not substantially greater than presented in the Feasibility Study Report.

Alternatives Comparisons Comment No. 5A. *Alternative 3 and Alternative 4 are far less effective than represented in the FS in reducing the toxicity, mobility and volume (TMV) of hazardous substances, in comparison to Alternatives 1 and 2.*

Alternatives 3, in particular, and Alternative 4 are far less effective in reducing the toxicity mobility and volume (TMV) of hazardous substances than was portrayed in the FS. The NCP (40 CFR 300.430) requires the evaluation of reduction of TMV (for all alternatives) based on the "amounts of hazardous substances, pollutants or contaminants that will be destroyed,

treated or recycled," or "the degree to which treatment reduces the inherent hazard posed by principal treatments at the Site." The method of calculating TMV reductions in the FS does not follow these requirements of the NCP. In the FS report, EPA estimates the quantity of both the hazardous and total organic (TOC) material removal, and the total inorganic (TDS) constituents removed as a basis for its TMV analysis. TOC and TDS concentrations are used as the surrogate parameters to calculate the total organic and inorganic constituent removals, respectively. The use of these parameters is inappropriate in the FS because these parameters are not hazardous substances, pollutants or contaminants as defined under Superfund. The resulting estimates of TMV reductions for organics and inorganics appear to be large for all alternatives, and especially large for Alternative 3 (for organics) and Alternatives 3 and 4B (for inorganics). EPA, therefore, incorrectly portrays Alternatives 3 or 4B as more effective in reducing the TMV of hazardous substances, when, in fact, the materials removed and/or treated are primarily nonhazardous salts and naturally occurring organics from the refuse decomposition. Clearly, TOC and TDS are not hazardous substances and do not pose a principal threat at the OII Site. The analysis of TMV reductions in the FS should be based on the total reduction of hazardous substances, not surrogate parameters.

The estimated amount of potentially hazardous organic substances removed by Alternative 3 (represented in the FS by VOCs and SVOCs in leachate) is only about 1.3% of the TOC removal credited to Alternative 3. Similarly, a comparison of the leachate constituent concentrations in Appendix F to the estimated inorganics removed from the landfill for Alternative 3 (as shown in Table 6-2a of the FS) indicates that less than 1% of inorganics removed are hazardous substances regulated under Superfund. Alternative 3 is clearly less effective in addressing substances regulated under Superfund than was portrayed in the FS.

EPA's Response. At the OII Site, reductions in total organic carbon and total dissolved solids are appropriate indicators of reductions in the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants. This is because total organic carbon and total dissolved solids are approximately proportionate to the hazardous substances, pollutants, or contaminants. Using these indicators for each alternative provides an appropriate basis to compare relative reductions in TMV. Furthermore, as leachate is a hazardous substance under CERCLA, the effectiveness of Alternative No. 3 is not overestimated by this method.

Alternatives Comparisons Comment No. 5B. *The analysis of TMV reduction for Alternatives 1 and 2 apparently did not consider the reduction in organic and inorganic hazardous substances that will result from LFG recovery and from the natural attenuation of landfill constituents in groundwater. Although these processes are common to all Alternatives, the omission of these "treatment" process from the TMV estimates particularly understates the effectiveness of Alternatives 1 and 2, on a proportional basis, in achieving the TMV reduction criteria.*

EPA's Response. As discussed above, landfill gas measures are required by the Gas Control and Cover ROD, and are not incorporated in or modified by this ROD. Implementation of these

measures is assumed for purposes of evaluating the remedy selected by this ROD. Both landfill gas collection and destruction and natural attenuation are discussed in the evaluation of reduction in toxicity, mobility, or volume for the remedial alternatives in Section 5 of the Feasibility Study Report. Because it is the same for all alternatives, inclusion of landfill gas considerations in the comparison of alternatives in Section 6 of the Feasibility Study Report would not change any of the conclusions. The discussion of reductions in toxicity, mobility, or volume through natural attenuation in Alternative No. 1 notes that there would be very little additional reduction of toxicity, mobility, or volume (over that already occurring without a remedy) for the groundwater contamination in the 30-year evaluation period because of the continuing influx of contaminants into the aquifer. Beyond noting that perimeter liquids control will significantly enhance natural attenuation by cutting off the source of contaminants to the aquifer, EPA does not believe that it is appropriate to credit any of the alternatives with reductions in the toxicity, mobility, or volume of hazardous substances that are occurring through natural processes (i.e., those that would be occurring with or without a remedy).

Alternatives Comparisons Comment No. 5C. *In summary, as a result of (1) the overestimate of the long term leachate recovery rate for Alternative 3 as discussed above in Comment 4, (2) the inappropriate use in both Alternatives 3 and 4 of surrogate parameters (TOC and TDS) to estimate the TMV reduction of hazardous substances, and (3) the failure to include LFG recovery and natural attenuation in TMV reduction estimates of all Alternatives, EPA has incorrectly portrayed Alternatives 3 and 4 as far more effective than Alternatives 1 and 2 in reducing the TMV of hazardous substances at OII.*

EPA's Response. EPA disagrees with the conclusions reached in this comment and believes that Alternatives No. 3 and 4 are more effective in reducing the toxicity, mobility, or volume of hazardous substances than either Alternatives No. 1 or 2 for the reasons outlined above. Item (1) in the comment is incorrect. EPA did account for significantly reduced leachate recovery rates in the calculation of constituent removal (as is noted on the tables in the Feasibility Study Report that present the contaminant removal volumes). The same reduction in flow rate described above in the response to Comment 4D was assumed for these calculations. Items (2) and (3) are responded to above in the responses to Comments 5A and 5B.

Alternatives Comparisons Comment No. 6A. *The FS in Section 3.6 (Figure 3-1) substantially understates the effectiveness and implementability of institutional controls in limiting exposure to landfill constituents in groundwater.*

EPA's Response. The adequacy and reliability of institutional controls are highly dependent on enforcement and maintenance by state and local regulators and adequate definition of the area of contamination over which institutional controls are required. Institutional controls can be subject to changes in the political jurisdiction, legal interpretations, and the level of enforcement, as well as to changes in the need for water resources. Institutional controls would only be effective with a high degree of certainty in the short term, because regulators of the institutional controls cannot ensure the effectiveness or enforceability beyond a number of

years. An example of one of the shortcomings of the effectiveness of institutional controls can be drawn from site access. Although it is illegal to trespass onto private property (an institutional control), such as the landfill, ARARs still require that an engineering control (a fence) be used to prevent potential exposure. The existence of institutional controls alone (a no trespassing law) is not considered sufficient to effectively prevent exposure. Similarly, restrictions on groundwater use alone are not considered highly effective at preventing exposure. Furthermore, the reliability of institutional controls decreases as the area to which they are applied expands and as the length of time for which they are necessary increases. However, despite their inherent potential limitations, institutional controls are incorporated as a key component of this remedy.

Alternatives Comparisons Comment No. 6B. *The FS identifies two institutional control process options as applicable to the OII Site, Deed Restrictions and Groundwater Well Permits. Both of these institutional controls are rated as only "slightly effective" for limiting exposure. The FS fails to identify water use allocation as an institutional control process option and states that "aquifer use restrictions may be voluntary." This incorrectly states the legal framework for control of groundwater use in the groundwater basins adjoining the OII Site.*

Construction of water wells and use of groundwater in the Central and San Gabriel Valley basins adjoining the OII Site are strictly regulated. Groundwater use in these basins was fully allocated by separate prior decisions of the Los Angeles County Superior Court. No property owner can legally drill and operate a well for water supply in these basins without first acquiring sufficient water allocation. Water allocation is administered by separate Water Masters in each basin. The allocations approval process provides an effective "process option" to regulate where wells are drilled and groundwater is pumped.

EPA's Response. EPA agrees that use of groundwater is regulated in the OII Site vicinity. However, EPA believes that the comment overstates the effectiveness of the existing system to regulate "where wells are drilled and groundwater is pumped." The judgments under which the Watermasters in both basins work cover water allocation, water rights, and the volumes of water that can be used, but do not address where the groundwater can be extracted. Thus, to implement the institutional controls required as part of this remedy, additional measures will be required. EPA anticipates that coordination with the Watermasters, Los Angeles County, as well as other governmental entities, will be an appropriate part of implementing institutional controls.

Alternatives Comparisons Comment No. 6C. *Furthermore, any production well constructed in these basins must also receive a construction permit from Los Angeles County. The permit review and approval process provides a second, redundant opportunity to control where wells are constructed proximate to the OII Site. With the coordination and cooperation of the Central and San Gabriel Valley Basin Water Masters and Los Angeles County, the use of groundwater near OII is currently very effectively controlled. The combination of water use allocation and/or well permits, as institutional controls, therefore, should be highly effective in limiting*

future exposure to any landfill constituents in groundwater near OII. Further information on the legal framework for institutional controls on groundwater use near OII is presented in a report prepared by ENVIRON entitled Groundwater Exposure Pathway Analysis, Operating Industries, Inc. Landfill, Monterey Park, California (November 1995), which is attached and incorporated into these comments.

EPA's Comments. EPA agrees that the Los Angeles County well permitting process potentially provides one method to partially control where water wells are constructed. However, EPA does not agree that "the use of groundwater near OII is currently very effectively controlled."

Alternatives Comparisons Comment No. 6D. *Even without these legal controls, it is highly unlikely that exposure to constituents in groundwater will occur in the future near the OII Site. The OII Site is located in a topographically high area, with little groundwater available in the area. There are currently no active water supply wells within more than one mile from the Site. Areas immediately adjoining the Site are serviced by municipal water supplies. The source(s) of water to these municipal water systems is not proximate to the OII Site and is not threatened by any release from the Site. Much of the groundwater near OII, in particular the areas west and south of the Site towards the Central Basin, is found in very low permeability siltstone of the Pico Formation, with little potential for development of water supply wells. This Formation is not used in the Central Basin to the southwest of the Site as a source of groundwater supply, and is not hydraulically connected to water supply aquifers in the shallower Lakewood/San Pedro formations of the Central Basin. Finally, landfill constituents in groundwater have been found to naturally degrade and attenuate, such that no significant impacts to nearby water supply aquifers are anticipated. The future control of LFG, surface infiltration and landfill liquids at the OII Site perimeter reduces the already low potential for groundwater impacts even further. Institutional controls, as part of an integrated final remedy, therefore, should be highly effective in preventing exposure to constituents in groundwater.*

EPA's Response. Although the generally low yields in the OII Site vicinity make large-scale, municipal well development unlikely, the aquifers do have the capacity to support potential residential or industrial uses (in fact, there is an irrigation well [currently inactive] at the southwestern corner of the South Parcel that previously served the Southern California Gas Company facility). EPA considered this limited potential for significant future use of groundwater in the vicinity of the OII Site as an important factor in the selection of the remedy. However, the comment is incorrect in stating that the Pico Formation is not "hydraulically connected to water supply aquifers in the....Central Basin." The Pico Formation directly underlies the Sunnyside Aquifer, one of the most heavily used drinking water aquifers in the Central Basin. Although the movement of water into the overlying aquifers from the Pico Formation likely represents a very small percentage of the total recharge into the aquifer, the two are hydraulically connected, as discussed in the Remedial Investigation Report.

EPA agrees that institutional controls can be an important component of preventing exposure to groundwater contaminants. EPA has incorporated institutional controls as a key component of this remedy, and EPA expects that institutional controls will prevent exposure to groundwater contaminants while perimeter liquids control and natural attenuation reduce groundwater concentrations to below cleanup standards.

Alternatives Comparisons Comment No. 7A. *With effective institutional controls that prevent exposure to groundwater, Alternatives 1 and 2 should be rated in the Detailed Evaluation of Alternatives (Chapter 5, Table 5-1) as equally protective of public health and the environment as Alternatives 3 and 4.*

In the FS "Detailed Evaluation of Alternatives" (Table 5-1), Alternatives 1 (No Further Action) and Alternative 2 (Perimeter Liquid Control) were evaluated by EPA to be adequate to prevent potential exposure to landfill constituents in groundwater, assuming institutional controls are effective. Because the principal institutional controls applicable to the area surrounding the OII site (water rights allocation and well construction permits) are permanent, were established by prior court decisions and promulgated regulations, and are implemented by local regulatory agencies whose responsibility is to control the use of groundwater in these basins and protection of public health, these institutional controls will be highly effective in limiting exposure during the time-frame applicable to remedies at the OII Site.

EPA's Response. As described above in the response to Alternatives Comparisons Comment 6, EPA does not believe that institutional controls alone are sufficient to protect human health and the environment at the OII Site. Institutional controls also do not protect water quality. Furthermore, as discussed in the Feasibility Study Report (Section 6.4.3), "institutional controls would be the most difficult to implement in Alternative No. 1 because the maximum extent of the inorganic contamination (and thus the area requiring institutional controls) is unknown and the institutional controls are required for the longest time." Thus, Alternative No. 1 is less protective than the other alternatives because the risk of potential future exposure is increased.

Alternatives Comparisons Comment No. 7B. *This protection is enhanced by the fact that there is no current use of groundwater within more than one and one-half miles from the Site, the area is already served by municipal water supplies, and the low yield of groundwater zones near the Site, making future nearby well development impractical. In comparison, Alternatives 3 and 4, which as discussed above in earlier comments, will probably not even result in a more rapid cleanup of groundwater than Alternatives 1 and 2, provide no greater level of protection of public health because there is no current or anticipated future use of groundwater in the area, and is no more effective in mitigating the already low risk of landfill liquids migration to groundwater producing zones more than one mile to the southwest in the Central Basin because of the mitigating effects of natural attenuation.*

EPA's Response. As stated above, EPA agrees that large-scale, municipal well development is unlikely in the OII Site vicinity; however, the aquifers do have the capacity to support potential residential or industrial uses.

For the reasons discussed above, EPA believes that Alternatives No. 2, 3, and 4 all offer much faster cleanup of groundwater than Alternative No. 1. Alternative No. 1 does not prevent additional migration of contaminants from the landfill to groundwater. As such, contaminants in groundwater will continue to increase, and natural attenuation cannot as effectively reduce concentrations to below cleanup standards.

EPA has noted in the Feasibility Study Report and Proposed Plan (and elsewhere in this ROD), that Alternative No. 3 will not result in faster groundwater cleanup than Alternative No. 2. However, through offsite pumping, EPA believes that Alternative No. 4 would definitely provide faster cleanup of inorganic constituents in groundwater than the other alternatives.

Alternatives Comparisons Comment No. 7C. *In addition, as discussed in Comment 8 below, Alternative 4 has significantly greater risk of impacts on the health, environment and aesthetics of the adjoining communities, particularly west and southwest of the Site due to the construction and operation of many groundwater extraction wells in publicly accessible areas and the associated piping and pump system that will require frequent maintenance. Alternatives 1 and 2 will have no extraction wells in the communities, and, in view of the effective institutional controls that will prevent exposure to any landfill constituents in off-site groundwater, these Alternatives are equally protective of public health and the environment as Alternatives 3 or 4.*

EPA's Response. Alternative No. 4 does have significantly greater impacts on the community than either Alternatives No. 1, 2, or 3. (The comment neglects to mention that Alternative No. 3 also has no extraction wells in the community.) EPA makes this point in the Feasibility Study Report, Proposed Plan, and elsewhere in this ROD. It should be noted, however, that additional health risks posed by Alternative No. 4 would be minimal.

Although there is relatively little difference in protectiveness of human health and the environment among Alternatives No. 2, 3, and 4, this is not the case for Alternative No. 1. Alternative No. 1 contributes to higher risks in several ways, including much longer groundwater cleanup times for both organic and inorganic constituents, more difficult implementation of institutional controls, additional migration of contaminants from the landfill to groundwater, and more extensive downgradient migration of inorganic constituents into areas currently unimpacted by landfill-related contaminants.

One of the goals of EPA's remedial efforts under Superfund is protection of the environment (not just human health). This includes protection of groundwater. Alternative No. 1 is much less effective than Alternatives No. 2, 3, and 4 in achieving this goal.

Alternatives Comparisons Comment No. 8A. *Alternatives 3 and 4 offer minimal incremental benefits for the protection of public health and the environment relative to their potentially significant short term and long term impacts on the community and incremental costs in comparison to Alternatives 1 and 2.*

As discussed in the above comments, the Steering Committee believes that Alternatives 3 and 4 are no more effective in controlling the migration of landfill constituents in groundwater or LFG than Alternatives 1 and 2. All alternatives include identical components for the capping of the landfill and the control of LFG. In addition, although Alternative 1 does not prescribe an explicit level of landfill liquids control, all alternatives provide some level of control of landfill liquids at the perimeter. The incremental benefit of Alternatives 2, 3, and 4 in controlling landfill liquids likely is minimal in many areas; and the need for any additional liquid control systems (e.g., groundwater extraction wells) in addition to the LFG recovery systems in Alternative 1 can only be established after the LFG recovery system and cover in Alternative 1 are constructed and operated for a period of time.

EPA's Response. As stated in previous responses, Alternative No. 4 prevents additional migration of inorganic constituents through offsite pumping at the current downgradient extent of contamination.

EPA further disagrees that the need for additional liquid control systems "can only be established after the LFG recovery system and cover in Alternative 1 are constructed and operated for a period of time." As stated in previous responses, there are ongoing, uncontrolled releases of landfill contaminants to groundwater. Perimeter liquids control is required in several areas to prevent additional release. The landfill gas control system to be implemented under the Gas Control and Cover ROD can meet the performance standards for perimeter liquids control only if extensive liquids control is planned in the areas needing containment (described in Section 8 of Part I of this ROD). The extent to which the landfill gas control system can meet perimeter liquids control performance requirements can be evaluated during remedial design of this remedy, as gas control system implementation progresses.

Alternatives Comparisons Comment No. 8B. *In assessing the potential impacts on the community during the implementation (construction) of each alternative, EPA correctly identified that all alternatives will have some measurable impact. In particular, Alternative 4 will have substantial impacts on the health, environmental and aesthetics of the community as a result of the construction of many groundwater extraction wells, piping systems and pumping stations to collect off-site groundwater and return it to the Site for treatment. Impacts on the community will include short term construction-related increases in traffic hazards, noise, dust and aesthetics. In addition, over the longer term the routine operation and maintenance of the large number of off-site groundwater extraction wells envisioned in Alternative 4 will involve frequent well and pump maintenance. There is also an increased potential for releases of contaminated groundwater from leaks or failures of pipe systems within the community that increases the risk of exposure to Site constituents.*

An important factor not considered in the FS is the impacts of Alternatives 3, and in particular Alternative 4, on the community by the use of valuable open space with the potential for development. Not only will Alternative 4 require the installation of many wells and pipes within the community in public areas, potentially restricting access, but also Alternatives 3 and 4 (with leachate extraction) may require a substantial expansion of the existing leachate collection system on the South Parcel, as discussed in Comment 4, and leachate treatment plant (LTP) on the North Parcel. On the South Parcel, a greater number of leachate extraction wells will likely be required to achieve the level of leachate recovery described for Alternatives 3 and 4 in the FS. These additional wells would reduce the potentially usable space on the top deck of the South Parcel. The expansion of the LTP will be the result of the need to handle higher quantities of liquids under Alternatives 3 and 4. An analysis of the existing LTP configuration by New Cure, Inc. indicates that, in order to treat the additional liquids recovered by Alternatives 2, 3, and 4, the LTP will need to be expanded to provide up to six additional carbon adsorption columns, two or more additional sand filters, a new or expanded precipitating clarifier, additional piping to convey leachate to the LTP, additional effluent storage tanks to allow for testing before a fluid is discharged and replacement of internal piping and pumps to convey larger flows through the treatment system. As a result, the size and complexity of the LTP may substantially expand over the current configuration, thereby involving greater use of available land on the North Parcel. The impact of LTP expansion on the potential future development of the North Parcel was not discussed in the FS, but is clearly of concern to the community based on the numerous comments received during the recent public meeting on the OII Proposed Plan.

EPA's Response. EPA agrees with this comment in general. However, EPA's detailed evaluation of the treatment plant capacity under Alternative No. 2 (presented in Appendix E of the Feasibility Study Report) found that the existing system should be sufficient with fairly minor modifications, primarily relating to piping and pumps, without expanding the footprint of the plant. Further, even if a minor increase in the footprint of the plant is necessary to implement the selected remedy, it would be unlikely to have any significant impact on future development of the North Parcel.

Alternatives Comparisons Comment No. 9A. *Because elements of the prior Records of Decision (RODs) for landfill gas control, landfill cover, Site control and monitoring, storm water management, leachate collection/conveyance/treatment, institution controls, security, and environmental monitoring are incorporated into all Alternatives considered in the FS, the only substantive difference among the four Alternatives is the strategy for control of landfill liquids and landfill constituents in off-site groundwater. Accordingly, the Detailed and Comparative Analysis of Remedial Alternatives in Chapters 5 and 6 of the FS, respectively, should be restructured, or expanded, to more clearly demonstrate, and assist decision makers in understanding, the incremental costs for landfill liquids and groundwater control in comparison to the overall performance offered by each Alternative in the achievement of ARARs and protection of public health.*

The four alternatives considered in the FS provide the same components for landfill cover, LFG control, leachate collection/conveyance/treatment, and monitoring. The primary difference among the four Alternatives is the manner in which landfill liquids and off-site groundwater are addressed. The cost presented in the Detailed and Comparison Analysis of Alternatives in Chapters 5 and 6 of the FS present the cost for landfill gas and cover, interim O&M and "alternative-specific" capital and O&M costs separately. The incremental cost for landfill liquids and groundwater control are included within the "alternative-specific" costs, but are not clearly identified in the cost summary tables (e.g., Table 6-3 of the FS). In addition, the discussion of cost as an evaluation criterion in Section 6-5 of the FS does not clearly distinguish the incremental cost of the various alternatives for landfill liquids and groundwater control, but focuses attention rather on the total present worth cost of the entire Site remedy. In order to assist decision makers in understanding the incremental costs and benefits for the various alternatives for landfill liquids and groundwater control, the discussion in Chapter 6 of the FS should be expanded to include a presentation of the incremental benefit and cost of Alternatives 2, 3, and 4 in comparison to Alternative 1. This expanded presentation would be particularly useful because, as discussed in prior comments, Alternative 1 may provide an adequate level of control of landfill liquids in many areas, and the additional pumping systems assumed in Alternative 2 may not be required to achieve the performance standard for liquids control.

EPA's Response. The comment is incorrect in that none of the alternatives includes or modifies elements required by the Gas Control and Cover ROD. All of the alternatives assume, however, that these elements will be implemented as required by that ROD. Costs of the remedies required by the Gas Control and Cover ROD were included for informational purposes only. The level of detail provided on the alternative costs in the Feasibility Study Report (including presentation of alternative-specific costs and overall costs) is sufficient for decisionmakers to evaluate the cost benefits of the alternatives. Previous comments have addressed the contention that the landfill gas and cover systems may provide sufficient perimeter liquids control.

Alternatives Comparisons Comment No. 9B. *For example, the modified no-action alternative in the FS (Alternative 1), the essential elements of which have already been committed to in CD-3, is projected to cost up to $346 million. The additional costs of Alternatives 2, 3 and 4 would be $20 million, $51 million and $68-$137 million, respectively. The only potential benefits portrayed in the FS for Alternatives 2, 3 and 4 not already provided by Alternative 1 are the reduction of the TMV of hazardous constituents and the theoretical decrease in the time to achieve ARARs in the offsite groundwater. As was detailed in earlier comments, the reduction of TMV has been incorrectly calculated in the FS. In comparison to Alternative 1, Alternatives 2, 3 and 4 likely only result in minimal additional reduction of the TMV of hazardous substances. The incremental per-unit cost of treating these additional hazardous substances in Alternatives 2, 3 and 4 is extremely large and not commensurate with the de minimis, hypothetical risks these substances pose in groundwater.*

EPA's Response. EPA believes that Alternatives No. 3 and 4 would result in several advantages over the other alternatives, including additional reduction of hazardous substances (as discussed in the response to Alternatives Comparisons Comment No. 5).

EPA believes the additional benefits of Alternative No. 2 significantly exceed its additional cost. These benefits include:

- Protection of the drinking water resource by limiting additional influx of contaminants and reducing additional contaminant migration
- Meeting ARARs for landfill closure and groundwater cleanup
- Substantially decreased groundwater cleanup times

Although the difference in alternative-specific costs presented in the Feasibility Study Report for Alternatives No. 1 and 2 is $20 million, this number only represents an increase of 14 percent. Further, as is acknowledged in the Feasibility Study Report, there is likely duplication in the cost estimates between elements required by the Gas Control and Cover ROD and this ROD. For example, Alternative No. 2 included costs for an extraction trench around the southwestern perimeter of the South Parcel. This trench could potentially be installed as part of the Gas Control and Cover ROD. Thus, the true cost difference between the two alternatives will likely be less than $20 million. Further reductions in cost could be achieved if other systems required for landfill gas control could be designed to meet the performance standards of this remedy as well.

Alternatives Comparisons Comment No. 9C. *Similarly, the projections in the FS that Alternatives 2, 3 and 4 result in a more rapid cleanup of groundwater, and thereby greater protection of public health in comparison to Alternative 1, are speculative at best. There is significant uncertainty regarding whether any additional measures beyond the cover and liquid control systems necessary to operate CD-3 (Alternative 1) will ever be required. Any decision today to expend an additional $20-$137 million (beyond Alternative 1) is clearly premature because CD-3 has not yet been implemented and its future impact on the control of landfill liquids and offsite groundwater quality cannot be fully measured at this time.*

EPA's Response. Please see previous responses to Alternatives Comparisons Comments No. 1, 2, and 3 for responses to the issues raised in this comment. EPA's decision is to require protection of groundwater; it is not a decision to expend additional funds. This decision requires perimeter liquids control to attain the benefits listed above in the response to Alternatives Comparisons Comment 9B. The response to Comment 9B also addresses potential cost savings that could be realized in implementing this remedy. However, EPA does not believe that it is appropriate to delay implementation of perimeter liquids control to see if other

measures will protect groundwater while contaminants continue to migrate uncontrolled to groundwater.

Alternatives Comparisons Comment No. 9D. *In conclusion, the FS has failed to demonstrate, by scientifically defensible analyses or actual Site data, that Alternatives 2, 3 or 4 offer any tangible benefits in comparison to Alternative 1. The incremental costs of $20-$137 million to implement Alternatives 2, 3 and 4, therefore, are inappropriately high. A more clear discussion of these benefit/cost considerations for Alternatives 2, 3 and 4 should be provided in Chapter 6 of the FS.*

EPA's Response. EPA believes that Alternative No. 2 does offer tangible benefits commensurate with the additional expenditures over Alternative No. 1 (as discussed above in the response to Comment No. 9B). However, EPA does agree that Alternatives No. 3 and 4 do not offer sufficient additional benefits to warrant the additional costs.

Risk Assessment Comment No. 1A. *The human health risk assessment in the FS is based on assumptions and relies on data which are invalid or inconsistent with the "modified no-action" alternative it is supposed to represent.*

The Risk Assessment for the OII Landfill is characterized by its authors as a "modified no-action" risk assessment. As such, it is based on the assumption that currently existing and operating control systems (or systems negotiated to be constructed and operated under current Consent Decrees) will continue in place. As is discussed more fully below, many of the assumptions used in the risk assessment are inconsistent with the definition of "modified no-action" described in the FS report. Furthermore, the risk assessment relied on data which are not representative of the concentrations of landfill constituents in air, soil, and groundwater under the modified no-action alternative.

In addition, we note that baseline risk assessments provide the basis for risk communication with the people who live and work in the vicinity of sites for which risk assessments have been prepared. The need for clear and accurate risk communication is particularly critical at sites such as OII where public awareness of the Site is high. We are concerned that risks calculated and presented in the OII risk assessment report are inaccurate, unclear, and, in some cases, misleading. A discussion of specific concerns is presented below.

The assumptions and data relied upon to estimate risks from exposure to landfill constituents in air are inconsistent with the concept of the "modified no-action" alternative described in the FS. The estimated health risks in the FS for air are based on ambient air samples collected between September 1989 and September 1990. Following collection of these air samples, additional gas collection systems were installed and landfill cover maintenance was improved. These gas control and maintenance measures were required by the existing Consent Decrees, and, as such, are enforceable elements of the Site remedy that were not in place when the prior air samples were collected. Accordingly, the potential improvement in ambient air quality

conditions after these controls were put in place would be consistent with and should have been considered in the "modified no-action" alternative that the health risk assessment is supposed to reflect. New air quality data should have been collected to reflect these changes in site conditions, or the prior data should have been modified or qualified as not being consistent with the assumed conditions of the Site in the risk assessment.

EPA's Response. As discussed above, landfill gas and cover remedies are not addressed by this ROD; and the results of the air pathway risk estimates were not used in the selection of this remedy. EPA acknowledges that improvements have been made to the landfill gas control system and to landfill cover maintenance since the ambient air samples used to estimate inhalation risks from the landfill were collected. Therefore, current risks from potential exposure to any contaminants remaining in ambient air are expected to be lower than those estimated in the risk assessment. Furthermore, these risks should continue to be lower as long as the existing improvements remain operative and/or adequately maintained. However, it should be recognized that the baseline risk assessment is intended to evaluate the potential exposures in the event that nothing is mitigated (or that mitigation measures fail). The collection of additional air samples subsequent to control system upgrades would have unnecessarily delayed the baseline risk assessment and required expenditures to collect data that would not impact the selection of a remedy.

Risk Assessment Comment No. 1B. *The approach used for estimation of the human health risks associated with the prior air data is inconsistent with the approach used in the ecological risk assessment in the FS. In the ecological risk assessment, exposure of terrestrial wildlife and plants to ambient vapors was considered an incomplete exposure pathway because the landfill gas collection system and the landfill cover would prevent airborne emissions. The older air quality data were not explicitly considered to estimate risks. If a consistent approach had been applied in the human health risk assessment, exposure to vapors should be likewise rated as an incomplete pathway, with no associated human health risk.*

EPA's Response. EPA acknowledges that, as noted in the comment, there is an inconsistency in the assumptions used for the human health and ecological exposure assessments. The ecological assessment should have considered exposure to ambient vapors as a complete pathway and recognized the possibility that wildlife, if present, could inhale constituents that volatilize from the landfill. However, because of the absence of significant and suitable habitat in areas surrounding the landfill, exposures via this route would be expected to be minimal. Thus, quantifying this pathway would not have significantly altered the conclusion of the baseline ecological risk assessment. However, even if exposure is significant, the solution would be to implement the landfill gas control and landfill cover systems previously selected in the Gas Control and Cover ROD.

Risk Assessment Comment No. 1C. *Another major concern is the inappropriate use of data artifacts in the risk assessment. Data artifacts are spurious detections of constituents that are not reproducible and cannot be verified by retesting. Data artifacts most often result from cross*

contamination of environmental samples in the field through inadequate sampling equipment decontamination, mislabeling of sample containers, or contamination accidentally introduced into the sample in the environmental laboratory when the sample is tested. Data artifacts do not represent real, scientifically-verifiable contamination in the environment, and should be screened from the environmental data before such data are used in a risk assessment. A number of the constituents listed in the FS in Table 2-8 are clearly data artifacts and should not be considered in the risk assessment or the FS.

EPA's Response. EPA did consider the data artifacts mentioned in this comment as part of the uncertainty and sensitivity analyses performed for the risk assessment. Following initial identification of risk drivers, the major risk contributors were re-evaluated to identify whether anomalous detections were influencing the results. For example, the single detection of 1,4-dioxane that was contributing to cancer risk in Well OI-10A was recognized as an uncertainty on page B-236. In addition, on pages B.2-21 and B.2-22, the report states the detection of 1,4-dioxane was anomalous and not representative of site-related contamination. Because of this, Well OI-10A was not included in the areas of concern identified for groundwater in Alternative No. 4.

Risk Assessment Comment No. 1D. *A significant portion of the risk estimated from the hypothetical ingestion of groundwater is attributable to data artifacts and high detection limits, which do not accurately reflect the true concentrations of constituents, and the potential for exposure to these constituents, in groundwater. For example, a substantial portion of the hypothetical risk from exposure to groundwater in Well OI-10A, located north of the Site, is from exposure to 1,4-Dioxane. 1,4-Dioxane was only detected once in this well, at a relatively high concentration of over 10,000 ppb. Four prior tests and at least seven subsequent tests of groundwater from this well failed to detect any 1,4-Dioxane at detection limits ranging from 1 to 5 ppb. Clearly, the reported detection of 1,4-Dioxane in this well is a data artifact, is not representative of true groundwater quality in this area, and should not have been used in the risk calculation for groundwater from this well. This is just one example of many instances where data artifacts were inappropriately used in the risk assessment.*

The potential for the occurrence of data artifacts is clearly noted in the promulgated state and federal regulations governing groundwater monitoring programs at waste disposal sites. Such artifacts are not considered to be real under these regulations unless they can be verified by subsequent groundwater tests. As such, the groundwater quality data at OII should have been screened to remove all sampling and laboratory induced data artifacts before these data were used in the risk assessment to portray hypothetical risks to exposure of these constituents in groundwater.

EPA's Response. Data artifacts are addressed in the previous response. It should be noted that groundwater risks were estimated two ways to account for the possible influences of non-detected constituents and elevated detection limits. This was done specifically to address this uncertainty. The estimated risk values used in the evaluation of alternatives were based on risk

estimates from individual wells with constituents not detected in that well not included as part of the calculation of exposure point concentrations. With this procedure, the more significant uncertainty is that, if detection limits were too high for specific constituents, the risk from these constituents would remain unaccounted for in the risk values (i.e., risks would be underestimated). It is less likely that elevated detection limits (for detected constituents) would cause a significant artificial increase in the estimated risks.

Risk Assessment Comment No. 1E. *Another example of an inappropriate assumption which materially affected the outcome of the Risk Assessment is the Reference Dose (RfD) for manganese. Based on telephone conversations between ENVIRON personnel and Dr. Susan Velazques of ECAO, the EPA in Cincinnati determined that the previously published Reference Dose (RfD) for manganese in drinking water was too low and should not be used for evaluating risks from manganese in drinking water. We note that the current version of the IRIS data base recommends using the chronic RfD for manganese in the diet divided by a modifying factor of 3 to evaluate manganese in drinking water (an excerpt from the IRIS data base is provided in Attachment A). The RfD currently recommended in IRIS for evaluating manganese in drinking water (i.e., 0.14 mg/kg-day ÷ 3 = 0.047 mg/kg-day) is nine times higher than the RfD (0.005 mg/kg-day) used in the risk assessment. As a result, the risk assessment in the FS overstates the risk of the theoretical exposure to manganese in groundwater by factor of at least nine or more.*

EPA's Response. The change in Reference Dose does not affect the outcome and conclusions of the risk assessment or feasibility study because: (1) As described in Appendix E of the Feasibility Study Report, hazard index values were not considered in the alternative development or alternative evaluation because of the complications associated with baseline considerations for inorganic constituents in the OII Site vicinity; and (2) The old Reference Dose was used for both the baseline risk estimate (presented in Appendix B.2) and for the well-specific risk estimates. EPA recognizes that the oral Reference Dose assessment for manganese was updated and replaced in November 1995. The risk assessment calculations were performed prior to this date and do not reflect this change. Because the revised Reference Dose is approximately an order of magnitude higher than the previous value, the estimated manganese risks should be about ten-fold lower than stated in the report.

Risk Assessment Comment No. 1F. *Finally, the soil sampling conducted at the OII Site and adjacent properties was not performed in an unbiased fashion, in that samples were preferentially collected, by design, in areas of suspected contamination only. The bias toward sampling contaminated subareas should be highlighted and qualified as an area of uncertainty in the risk assessment report. We note, for example, that soil sampling in the Iguala Park adjacent to the landfill focused on stained soil and soils in low lying areas where leachate was known or suspected of having contaminated soil. The resulting estimate of soil concentrations in the soil in the park does not accurately reflect the exposure concentrations that a person using the park would have experienced. Because the risk estimate for the soil is based on a biased sampling method, the risk estimate presented in the OII risk assessment report provides a misleading overestimate of the actual risks associated with use of the park. People in the*

vicinity who may have used the park in the past also may be misled about health risks associated with their previous use of the park.

Because the risks presented in the report are based on assumed conditions that never existed, or no longer exist and are expected to continually improve over time, they are incorrect and/or misleading. People in the neighborhood who read or hear about these risks could easily get the mistaken impression that these are the risks to which they have been exposed, are currently exposed, or will be exposed as long as they remain in their home. The risk assessment should be clearly qualified or modified to more accurately state current conditions and risks near the Site.

EPA's Response. Soil concentrations detected at the site were not considered elevated enough above background such that the risks are unacceptable or that action to remediate soil is warranted, as stated in Section 3 of the Feasibility Study Report and on page B-308 of the Risk Assessment. Thus, having lower concentrations from random samplings of soil would not have affected the outcome and conclusions of the baseline risk assessment or the feasibility study. EPA acknowledges that some of the soil sampling performed during the remedial investigation was focused on potentially contaminated areas rather than random. This is a common uncertainty associated with many Superfund (and non-Superfund) investigations. Risk communication is discussed in the following response.

Risk Assessment Comment No. 2A. *The risk communication value of the baseline human health risk assessment would be substantially enhanced by a clear discussion of the fact that Superfund risk estimates are intended to be upper-bound estimates of risk and by identifying more clearly and specifically the assumptions that cause the risk estimates in the OII Baseline Human Health Risk Assessment to be upper-bound estimates.*

It is reasonable to expect that people who live in the vicinity of the OII landfill will look to the risk assessment to help answer their questions as to whether the landfill poses any actual health risk to them. People not familiar with regulatory risk assessments are unlikely to understand that there are many assumptions used in the risk assessment that do not necessarily reflect anyone's actual exposure and that are specifically intended to overestimate risk. Similarly, people not familiar with regulatory risk assessment are unlikely to appreciate the effect of compounding of multiple conservative assumptions on causing estimated risks to be elevated above most likely or best estimates of risk.

Because of the high level of community concern, it would be helpful to mention the results from two previous epidemiology studies of people living in the vicinity of the landfill. The first study was a cancer epidemiology study published by Drs. Mack and Pinder of the USC School of Medicine.[2] This study was commissioned by the California Department of Health Services and the Los Angeles County Department of Health Services. The authors of this study concluded that there was no evidence linking the OII Landfill to the occurrence of cancer and that anxiety in the local community regarding excess cancer related to the landfill was not warranted.

[2] *Mack, T.M. and R.L. Pinder. 1988 Assessment of Cancer Risk to Persons Residing Near Operating Industries, Monterey Park Landfill" USC School of Medicine, Department of Preventive Medicine. A report to: California State Department of Health Services, Office of Environmental Health Hazard Assessment, Contract #85-86998, ID #81966 and Los Angeles County Department of Health Services, Toxics Epidemiology Program, Contract #17900.*

The second study was performed by the California Department of Health Services (DHS, 1986)[3]. The DHS Study investigated a wide range of health effects and symptoms. The authors of the DHS Study concluded that when compared to neighborhoods similar to those around OII, the residents in the vicinity of the OII landfill demonstrated no significant excess incidence of "major medical problems, including overall mortality, cancer, liver disease, and adverse pregnancy outcomes."

[3] *Satin, K.P., S. Huie, and L. Croen, 1986. Operating Industries, Inc. Health Effects Study. October. Epidemiological Studies and Surveillance Section, California Department of Health Services, County of Los Angeles Department of Health Services, and University of California, Berkeley.*

EPA needs to add a short discussion of the nature of regulatory risk assessment, noting that such risk assessment is intended to be upper-bound estimates. In particular, a section specifically discussing the key assumptions used in the risk assessment and describing how they differ from most people's actual exposure is critical. To help people understand the nature of regulatory risk estimates, we suggest complying with the EPA Cancer Guidelines regarding the fact that regulatory risks produce upper-limit estimates of risk:

> *"The range of risks, defined by the upper limit given by the chosen model, and the lower limit, which may be as low as zero, should be explicitly stated." EPA Guidelines for Cancer Risk Assessment (51 FR 33992, 24 September 1986).*

It also is essential to add the quote recommended in the Supplemental Superfund Guidelines by Region IX for conveying the concept that these risks are upper-bound (Risk Assessment Guidance for Superfund Human Health Risk Assessment. USEPA Region IX Recommendations, 15 December 1989 (Interim Final):

> *"These values are upper-bound estimates of excess cancer risk potentially arising from lifetime exposure to the chemical in question. A number of assumptions have been made in the derivation of these values, many of which are likely to overestimate exposure and toxicity. The actual incidence of cancer is likely to be lower than these estimates and may be zero. "*

EPA's Response. For risk management decisionmaking purposes, the Baseline Risk Assessment uses health-conservative assumptions such that resulting risk estimates are not likely to underestimate actual site risks. It is true that risks estimated in the Baseline Risk Assessment are probably elevated above the "most likely or best estimates of risk." This is in accordance with Risk Assessment Guidance for Superfund (RAGS) (EPA, 1989d), which states in Section 6.1.2 that "Actions at Superfund sites should be based on an estimate of reasonable

maximum exposure expected to occur...at a site." Thus, remedial actions at Superfund sites are not based on "most likely or best estimates of risk."

The appropriateness of using a reasonable maximum exposure as the basis for remedial decisionmaking at Superfund sites is reaffirmed in OSWER Directive 9355.0-30 (EPA, 1991k) which states "...where the baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions....exceeds the 10^{-4} lifetime excess cancer risk end of the risk range, action under CERCLA is generally warranted at the site."

Further, the NCP (40 CFR 300.430) notes that remediation at Superfund sites shall be based on "concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}." An established procedure does not yet exist for making "most likely" or "best" estimates of risk within the range of uncertainty for cancer risk assessment.

Accordingly, the reasonable maximum exposure risk estimates developed for residential neighbors of the OII Site are not meant to be applicable to most individuals in the community; rather they are designed to estimate potential risks for the most highly exposed individuals.

It should be noted that the National Research Council endorsed EPA's basic approach to risk assessment in its recent review mandated by the 1990 Clean Air Act. The National Research Council found EPA's approach to risk assessment "fundamentally sound." The National Research Council recommended that EPA retain its conservative, default approach to assessing health risks.

The baseline risk assessment specifically points out that risk estimates are based on health-conservative assumptions. Examples include:

- Table B5-21 lists several factors that may have the effect of overestimating risks.
- Page B-175 states that "the groundwater exposure pathway is evaluated to provide a health-conservative estimate on groundwater-related risk."
- Page B-177 defines reasonable maximum exposure estimates as a "health-protective exposure estimate (well above the average)."
- Cancer slope factors are identified as the upper 95 percent confidence limit on the cancer dose-response slope, Page B-194.

EPA is familiar with the epidemiological studies noted in the comment. The primary mandate of the Superfund program with respect to human health is to protect the public from unacceptable risks due to ongoing and future exposures to contamination at uncontrolled hazardous waste sites. Epidemiology studies, by their nature, are retrospective (i.e., they attempt to measure health effects of historical or past exposures). Therefore, it is not typical to

consider the results of negative epidemiological studies in a Superfund risk assessment. In addition, EPA guidance does not specify a risk or public health role for incorporating the results of epidemiological studies in remedial action decisionmaking for Superfund sites. One reason for this is that epidemiological studies are often too limited in size or scope to be adequately sensitive to risk levels that are of concern for the Superfund program.

Risk Assessment Comment No. 2B. *Some of the specific facts that would help people living in the vicinity of the landfill to understand the relevance of the risk assessment results would include:*

- *Inhalation risks are based on measurements that do not reflect either current conditions at the Site or the controls measures and maintenance programs that have been put in place since the measurements were taken.*
- *Ambient air measurements were made at the landfill boundary and concentrations dropped off very quickly within a short distance from the landfill. Consequently, the measurements made at the boundary do not reflect exposure to people living in the communities surrounding the landfill.*
- *Soil sampling in Iguala Park focused on areas suspected of being contaminated, rather than representative areas where people visiting the park would reasonably be expected to come into contact with soil. Thus, the risks presented in the report are not likely to represent risks for a typical park visitor.*

EPA's Response. The first and third bullets repeat comments from Risk Assessment Comment No. 1; EPA's responses are provided above. The second bullet's suggestion that concentrations in ambient air "dropped off very quickly within a short distance from the landfill" is not substantiated. Although it would be expected that concentrations in ambient air would reduce as a function of distance from the landfill source, there are no ambient air data away from the OII Site perimeter to verify this reduction or to estimate the rate of reduction.

Risk Assessment Comment No. 3. *There is no current risk from exposure to landfill constituents in groundwater at OII. The actual risk from groundwater should be portrayed in the FS as purely hypothetical.*

The ingestion of groundwater from the "aquifer" zones in the vicinity of the landfill is purely a hypothetical exposure pathway. For this reason, the estimated risks associated with the ingestion of groundwater should be clearly labeled as being hypothetical. It is a common practice in risk assessments to label the groundwater ingestion pathway as being hypothetical in situations where it is unreasonable to expect the water is being used for domestic water supply or could be used for such purposes in the future. As was clearly shown in the ENVIRON report entitled Groundwater Exposure Pathway Analysis, Operating Industries, Inc. Landfill, Monterey Park, California, November 1995, and attached to these comments, many of the

aquifers zones adjacent to the landfill yield very small quantities of water and would be impractical sources of water supply. There are currently no water supply wells within more than one mile from the Site. In addition, the legal right to pump and use groundwater from the area surrounding the landfill has been adjudicated and fully allocated. A property owner cannot legally install a new water supply well in the area surrounding the landfill without permission of the basin Water Masters and LA County. Because the area is served by a public water supply system and because the aquifer does not yield useable volumes of water, there would be no motivation for a person to use the local aquifers as a source of drinking water. As such, OII poses no current threat to drinking water supplies, or by other groundwater pathways, of direct exposure to residents living near the landfill. This position was clearly stated by EPA in its recent public announcement of the OII Proposed Plan (May 1996). Also, it has been demonstrated through fate and transport modeling by EPA and the Steering Committee that constituents in the groundwater near the landfill are not expected to migrate to more distant aquifers that serve as sources of drinking water. As such, risk associated with current groundwater usage near OII is purely hypothetical.

EPA's Response. EPA acknowledges that groundwater risk estimates in the baseline risk assessment reflect hypothetical conditions for future exposure. The first sentence of Section B3.2.3.2 explicitly states that "use of groundwater in the vicinity of the landfill is not currently known to be a complete pathway." This assertion is reiterated on page B.2-17 of the Feasibility Study Report (EPA, 1996). In addition, the Proposed Plan specifically states "only hypothetical risks have been evaluated because there is not currently any use of groundwater in the vicinity of OII." The aquifer near the landfill has been identified as a potential source of drinking water in the Basin Plan, has been used in the past for irrigation purposes (at the Southern California Gas Facility), and could be used in the future.

Risk Assessment Comment No. 4A. *The principal risk from the hypothetical ingestion of groundwater is attributable to naturally occurring inorganic constituents (e.g., metals) in groundwater. As such, risk comparisons presented in the FS do not provide information that distinguishes one alternative from another.*

A large portion of the estimated risks for the hypothetical ingestion of groundwater is attributable to naturally occurring background levels of metals, in particular, arsenic. The risk contribution of other inorganic constituents (e.g., antimony) is small by comparison.

EPA's Response. The principal risk from ingestion of groundwater is not related to naturally occurring levels of inorganic constituents in all wells. In many wells, the principal risks are related to landfill-related organic contaminants (e.g., vinyl chloride) and inorganic contaminants that may be naturally occurring at low concentrations but have been elevated from landfill impacts. However, as noted in Appendixes E and G of the Feasibility Study Report, the risk assessment results were not used to identify the areas of concern for groundwater contamination in the remedial alternatives.

Risk Assessment Comment No. 4B. *In the FS, EPA estimates that the incremental risks from landfill constituents in groundwater are small, and the hypothetical groundwater risks in off-site downgradient areas are in the same range as background areas. As such, considering that the landfill gas control systems required by CD-3 will necessarily provide some level of landfill liquids control, any additional liquid control systems contemplated by Alternatives 2, 3, and 4 would have little incremental value, in comparison to Alternative 1, in controlling the purely hypothetical risk of exposure to landfill constituents in groundwater.*

EPA's Response. In many wells, including some wells in "off-site downgradient areas," EPA has identified very high potential risks that are directly related to landfill contamination. EPA has stated that none of the alternatives offers a substantial reduction in overall risk for the areas further away from the landfill perimeter. However, Alternatives 2, 3, and 4 do offer a much faster reduction in site-related risks in groundwater over Alternative No. 1.

Risk Assessment Comment No. 4C. *The substantial contribution of naturally occurring background metals in groundwater to the estimated groundwater risks is acknowledged by EPA in the FS, and is an important aspect of the risk communication function of the risk assessment report. Regardless of any impacts from the Site, it is important for people reading the risk assessment to understand that because of background metals, ingestion of the groundwater near OII would never likely occur, with or without any impact from the landfill.*

EPA's Response. The commentor is incorrect in that the presence of background metals in the OII Site vicinity would not inhibit use of this water as a drinking water source. The baseline concentrations of the inorganic constituents causing elevated risk, such as arsenic and beryllium, are well below their drinking water MCLs. There is no water-quality related reason, excluding landfill-related impacts, that the naturally occurring levels of metals would limit use.

Risk Assessment Comment No. 5. *Uncertainties and qualifications in the risk assessment and the FS should be clearly stated and considered in the Alternatives analysis.*

A required element of a Baseline Risk Assessment is identification and discussion of the uncertainties associated with the risk assessment. A much clearer understanding and statement in the FS of the uncertainties associated with the hypothetical risks from exposure to air, groundwater, and soil for the OII landfill is needed, and would be particularly important for someone trying to make (or understand the basis of) remediation decisions at the Site. A substantial portion of the risk estimated in the FS is attributable to (1) assumptions and old data that do not represent current conditions and are inconsistent with the "modified no-action" alternative, (2 sampling artifacts, (3) naturally occurring constituents and (4) hypothetical pathways for exposure (particularly in groundwater) which do not exist. It is important to clearly qualify the risk assessment and consider uncertainties in the alternatives analysis and the resulting remedy selection process.

EPA's Response. EPA did consider the uncertainties in the risk assessment results in its analysis of alternatives. In the comparison of alternatives, EPA noted the uncertainties in evaluating the "site-related" portions of the groundwater risks. Further, throughout the Baseline Risk Assessment, EPA clearly noted areas of uncertainty.

In addition, the risk estimates had a fairly limited impact on the remedy selection process. Risk values for groundwater were not used directly to estimate areas of concern for groundwater. The risk estimates for soil were determined to not be elevated enough above background to warrant action. The air risk estimates have no impact on this ROD because the final landfill cover and landfill gas systems were previously addressed in the Gas Control and Cover ROD and are not included in or modified by this ROD.

Specific responses to items (1) through (4) are included in prior responses.

Risk Assessment Comment No. 6. *The Cogliano theory for calculating risks to vinyl chloride method has not been sufficiently developed to be used as the primary basis for quantifying risk to vinyl chloride and has not been consistently used to evaluate vinyl chloride risks within the OII risk assessment.*

The discussion presented on pages B-211 through pages B-213 of the Baseline Human Health Risk Assessment summarizes a theory for calculating vinyl chloride risks developed by Dr. Cogliano. The method is apparently based on a memorandum by Dr. Cogliano ("Cogliano memo"). Although the theory developed by Dr. Cogliano is mentioned in the risk assessment report, the 1992 memorandum from Dr. Cogliano that is cited in the risk assessment is not included in the risk report or elsewhere in the FS document. Because the Cogliano theory is such an important aspect of the risk assessment and because the memorandum is not a readily available document, it should be provided as part of the record.

The use of the Cogliano theory for calculating risks for vinyl chloride is not consistent within the OII Baseline Human Health Risk Assessment report itself. This inconsistency stems from the fact that while the basic concept of Dr. Cogliano's approach was described in his September 1989 memorandum (and subsequently modified in the 1992 memorandum cited in the risk assessment), further development of the theory into a method that can be applied to a multi-pathway risk assessment is still needed. The Cogliano theory was apparently applied in the manner discussed in the comment above for the calculation of risks from inhalation of ambient air. For vinyl chloride exposures resulting from the inhalation of vapors released from the hypothetical use of groundwater for domestic purposes, however, risks were calculated using the standard multiplication of the cancer slope factor for vinyl chloride by the lifetime average daily dose. The Cogliano theory was then used as a sensitivity analysis in the characterization of uncertainties associated with the risks estimated for vinyl chloride vapors from the hypothetical use of groundwater (Table B5-5). The Cogliano theory was not used at all in the calculation of risks from dermal or ingestion exposures to vinyl chloride (p. B-213). Similarly, the theory was not used at all in the calculation of Risk Based Concentrations for vinyl chloride

(Section B6.0). It is not clear why three entirely different approaches to evaluating vinyl chloride risks were used in the risk assessment for this single site. We are concerned that this internal inconsistency will cause confusion in the community and will undermine confidence in the risk assessment.

Using the Cogliano theory in the OII Baseline Human Health Risk Assessment would be a departure from previous action at Superfund risk assessments within Region IX and, we believe, Superfund risk assessments throughout the U. S. Although Dr. Cogliano's theory has been available for about 7 years, to the best of our knowledge it has never been applied to any baseline human health risk assessments for Superfund sites, including risk assessments performed by the EPA. Furthermore, Region IX EPA did not use the Cogliano theory in its recently published Table of Preliminary Remediation Goals (Region IX Preliminary Remediation Goals (PRGs) Second Half 1995). Similarly, Region III did not use the Cogliano theory for calculating PRGs (Risk-Based Concentration Table, October 20, 1995). To the best of our knowledge, no California state agency has adopted it as a method for calculating risks from long-term exposure vinyl chloride. By using it at OII, the EPA would be holding OII to a higher standard than other sites are being held. We believe there are several issues that need to be carefully considered and resolved before the theory can be applied. We believe that the internal inconsistencies within the risk assessment point to at least some of the issues that need to be addressed and point to the fact that the theory has not been sufficiently developed to be applied at this time. Consequently, we do not believe it is appropriate to use the Cogliano theory for quantifying risks in regulatory decisions at all.

Although EPA has adopted a new policy requiring that risk to children be given specific consideration in regulatory decisions, the issue of the possibility of children being particularly sensitive to vinyl chloride can be addressed qualitatively, and it is premature to apply the Cogliano theory to quantify such sensitivity. The fact that the Cogliano method has been available for 7 years and has not been adopted for use in Superfund or other regulatory program is largely attributable, we believe, to questions regarding the appropriateness of using the theory and unresolved questions about the specific procedures to use in the application of the theory to estimating risks and calculating risk-based concentrations.

EPA's Response. This comment addresses an enhanced risk assessment technique used for the OII Site baseline risk assessment to estimate excess lifetime cancer risks for infants and young children exposed to vinyl chloride by inhalation. This enhanced risk assessment technique is referred to in the OII Site risk assessment (Appendix B of the Feasibility Study Report) as the "Cogliano approach."

This risk assessment technique for vinyl chloride has received considerable review and acceptance in the scientific community. It is supported by EPA risk assessment policies and guidance on risk assessment. It is being consistently and widely used within Region IX and has been reviewed for use by other Regions in the Agency. This approach has been sufficiently developed to be a reasonable use of the best scientific information available and is becoming

standard-of-practice for EPA risk assessments involving children potentially exposed to airborne vinyl chloride.

Background: The "Cogliano approach" used in the OII Site baseline risk assessment for assessing cancer risks to infants and young children potentially exposed to vinyl chloride vapor in ambient air is based on an analysis of data on early-life carcinogenesis that was not available at the time the current cancer potency factor for vinyl chloride was determined by EPA. In performing this analysis, Dr. Cogliano was responding to a request for assistance from Region IX with regard to potential in-home exposures to vinyl chloride at another Superfund site. Region IX's request and Dr. Cogliano's analysis and the subsequent evaluation of potential in-home vinyl chloride exposures at the other Superfund site all predated EPA's in-home monitoring project performed at the OII Site.

Region IX requested Dr. Cogliano's assistance because of the availability of newer studies not specifically mentioned in the existing cancer risk assessment for vinyl chloride and their potential implication that infants and young children may be especially susceptible to the carcinogenic action of inhaled vinyl chloride. The "Cogliano approach" resulted from a project undertaken jointly by toxicologists from Region IX and Cal/EPA along with Dr. Cogliano to address mutual concerns about the adequacy of the existing risk assessment procedure for vinyl chloride.

The Cogliano approach is continuing to gain recognition and acceptance in the scientific community.

Scientific Meetings/Conferences: This approach has been presented and discussed at a number of national and international scientific meetings:

- In February 1990, this approach was the subject of a presentation by Dr. Cogliano, "Vinyl Chloride: Another Look" at the 29th Annual Meeting of the Society of Toxicology. An abstract of the presentation was published in The Toxicologist 10:349, 1990.

- In May 1990, the underlying cancer bioassays and conclusions were discussed by Dr. Cogliano and other participants at EPA's Risk Assessment Forum Colloquium on Children as a Sensitive Subpopulation.

- In November 1990, Dr. Cogliano presented "Early Life Sensitivity to Vinyl Chloride-Induced Carcinogenesis" at the conference on Similarities and Differences Between Children and Adults: Implications for Risk Assessment, sponsored by the International Life Sciences Institute and EPA.

- In November 1991, this material was included in a presentation given by Dr. Cogliano, "Some Implications of Toxicology and Pharmacokinetics for Exposure Assessment" at the conference on Understanding and Predicting Exposures in the 21st Century.

- In May 1993, this material and its use at the OII Site were the basis of a presentation by Dr. Hiatt, "Vinyl Chloride Action Levels - Indoor Air Exposures at a Superfund Site" given at the International Conference on the Health Effects of Hazardous Waste, sponsored by the U.S. Department of Health & Human Services.

- In May 1993, this material and its use at the OII Site were also the subject of a presentation by Dr. Hiatt, "Vinyl Chloride - Indoor Action Levels at a Superfund Site" given at the Annual Meeting of EPA Regional Risk Assessors.

- In December 1993, this material and its use at the OII Site were the basis of a presentation by Dr. Hiatt, "Vinyl Chloride - Indoor Air Action Levels at a Superfund Site" given at the Annual Meeting of the Society for Risk Analysis.

Scientific Publications: This approach has been the subject of a number of publications in the scientific literature:

- A paper based on the presentation, "Some Implications of Toxicology and Pharmacokinetics for Exposure Assessment" at the conference on Understanding and Predicting Exposures in the 21st Century was peer-reviewed, accepted, and published in the Journal of Exposure Analysis and Environmental Epidemiology, Supplement 1, 1992.

- A paper based on the May 1993 presentation, "Vinyl Chloride Action Levels - Indoor Air Exposures at a Superfund Site" given at the International Conference on the Health Effects of Hazardous Waste was peer-reviewed, accepted, and published in the monograph Hazardous Waste and Public Health: the International Conference on the Health Effects of Hazardous Waste. Page III-87, 5th paragraph/bullet:

- A paper on the cancer risk assessment basis of this approach has been peer-reviewed, accepted, and published in the journal Toxicology, 1996.

EPA Risk Assessment Policies, Guidance, etc.: This approach is consistent with EPA guidance documents, policy statements and scientific interpretations concerning risk assessment in general and its specific applications to children and vinyl chloride. These include:

- New Policy on Evaluating Health Risks to Children (EPA, 1995a), which states "[i]t is the policy of the U.S. EPA to consider the risks to infants and children consistently and explicitly as a part of risk assessments generated during its decision making process ...

the Agency will develop a separate assessment of risks to infants and children ..." The policy memo cites "age-related variations in susceptibility" as one of the factors dictating a need for an assessment of risks specifically for infants and children.

- A statement appended to the cancer potency assessment for vinyl chloride in the Health Effects Assessment Summary Tables that notes: "The most recently reviewed quantitative toxicity values listed here appear in EPA documents published in 1984 and 1985. ... The Office of Health and Environmental Assessment's position is that these toxicity values do not reflect state-of-the-art science for vinyl chloride. ... Additional information that may be factored into a revised quantitative toxicity value includes data on increased sensitivity observed in young animals... A unit risk for air [exposures] that considers information on young age exposure increases the risk ... by at least 3-fold."

- The preamble to the National Contingency Plan (55 Federal Register 8717) (March 8, 1990) notes that "population sensitivities" are one of the risk factors that justify revising preliminary remediation goals at Superfund sites.

Consistent Use in Region IX: This enhanced risk assessment approach for inhalation exposures by infants and young children to airborne vinyl chloride has been used consistently by Region IX since its development, which was prior to its use for the OII Site risk assessment. The approach was initially developed and used for an assessment of potential in-home exposures to vinyl chloride at another Superfund site, the Fresno Sanitary Landfill. This project was conducted in 1991 and involved the use of action levels for responding to in-home exposures to vinyl chloride. Similar to the OII Site in-home air monitoring project, these action levels were based on the enhanced risk assessment for infants and young children exposed to vinyl chloride by inhalation. Thus, the development and use of this approach predates its use at the OII Site.

Subsequent to its use on the OII Site, the enhanced vinyl chloride risk assessment continues to be used by Region IX for both Resource Conservation and Recovery Act of 1976 (RCRA) and Superfund sites. At the BKK Landfill RCRA site, this approach was used in developing risk-based response action levels for an ongoing community air monitoring program (BKK Response Action Plan for Vinyl Chloride). It is also currently being used to develop proposed action levels for a project assessing potential indoor exposures to vinyl chloride at the South Bay Asbestos Superfund site.

It is true, as mentioned in the comment, that "... Region IX did not use the Cogliano [approach] in its recently published table of Preliminary Remediation Goals ... [and] Region III did not use the Cogliano [approach] for calculating PRGs ..." PRGs are developed as risk screening tools and initial design targets for remedial engineering and planning. As such they are generic and are not meant to incorporate every potential exposure scenario or pathway. As noted earlier, the existence of sensitive subpopulations (e.g., infants and children who are highly susceptible to the carcinogenic action of inhaled vinyl chloride) is specifically identified in the NCP as one of

the risk factors that justify revising preliminary remediation goals. In addition, the Region IX Preliminary Remediation Goals table specifically notes that "... the user of the table should consider whether the exposure pathways and exposure scenarios at the site are fully accounted for in the PRG calculation." With regard to situations where infants and children are exposed to airborne vinyl chloride, Region IX has made the determination that their exposure scenario is not fully accounted for in the PRG calculation.

The approach has been used consistently since its initial development to assess risks or set risk-based action levels at RCRA and Superfund sites where there is the potential for infants or young children to be exposed to vinyl chloride via inhalation. Thus, this risk assessment approach has become standard-of-practice in Region IX for these types of vinyl chloride risk assessments.

Inconsistent Use for the OII Site Risk Assessment: It is true, as noted in Comment 6, that this approach was not consistently used to evaluate vinyl chloride risks for the OII Site risk assessment. Specifically, this approach was not used to assess the inhalation risks to residents from airborne vinyl chloride associated with domestic uses (e.g., showering, bathing, dish washing) of drinking water contaminated with vinyl chloride.

The reason this approach was not used was purely one of expediency and efficient use of resources. Its absence does not materially affect the conclusions of the risk assessment. EPA's initial review of the draft OII risk assessment noted that the assessment of risks from potential use of groundwater for drinking water purposes (which typically includes a consideration of indoor inhalation exposures to any volatile organic compounds present) did not use this approach to address vinyl chloride inhalation risks to infants and young children. Subsequent analysis showed that if the risk assessment were revised to incorporate this approach, it would increase the estimated risks via this potential exposure pathway. There was already sufficient information in the Feasibility Study Report to identify contaminant levels in groundwater as excessive and unacceptable and, therefore, incorporation of the "Cogliano approach" into this section of the risk assessment was deemed unnecessary.

EPA therefore decided not to spend the resources needed to incorporate the "Cogliano approach" into the groundwater risk assessment. EPA acknowledges this deficiency in the risk assessment and keeps in mind that its inclusion would have strengthened the conclusions regarding unacceptable levels of groundwater contamination.

Summary: In summary, it is EPA's position that the techniques used for the OII Site risk assessment to assess cancer risks to infants and young children potentially exposed to vinyl chloride by inhalation represent reasonable uses of the best science available at the time the risk assessment was performed and are consistent with existing EPA guidance and policies concerning risk assessment. In addition, this approach has been consistently applied by EPA Region IX to vinyl chloride risk assessments, both preceding and subsequent to, its use at the OII Site.

The method was not used for the dermal or ingestion routes considered in the risk assessment because insufficient evidence exists for increased young age sensitivity via these routes.

The memoranda from Cogliano have been provided as part of the administrative record and are included as Appendix B.

Risk Assessment Comment No. 7. *The calculations for cancer risks for vinyl chloride inhalation applied the Cogliano theory. The calculations included an error that substantially overestimated the risk associated with vinyl chloride. Had the method been applied as intended by EPA, the application of the Cogliano theory in the risk assessment double counts certain exposures and introduces methodological inconsistencies.*

Equation 4-2, presented on page B-213, was used to calculate the age-apportioned inhalation risks from vinyl chloride. To use this equation, one must specify a duration of exposure as well as the specific age intervals during the exposure period. As is discussed more fully below, these factors have not been clearly stated in the report.

Table B5-1 of the Baseline Human Health Risk Assessment presents inhalation risks for the "Adult Resident reasonable maximum exposure Scenario." The several exposure parameters corresponding to the reasonable maximum exposure for residential intake of ambient air are presented in Table B3-3. Among these exposure parameters are the assumptions that the adult resident has a 70 kg body weight, breathes 20 m^3/day of air and has a 30 year exposure duration.

Based on the exposure parameters presented in Table B3-3, we understand that an exposure duration of 30 years was assumed in the calculation of risks for inhaled vinyl chloride. As noted above, the use of Equation 4-2 to calculate risks requires specifying the specific age intervals for a person assumed to be exposed for 30 years. This is because, according to the Cogliano theory for calculating vinyl chloride risks, a person becomes much less susceptible to vinyl chloride carcinogenicity with increasing age. We were not able to find any identification of the age intervals assumed for the 30 year exposure duration. Based on a telephone conversation between ENVIRON and EPA on June 20, 1996 we understand the assumed age of the person used for the 30 year exposure duration is 0 to 29 years. Thus, the "adult" scenario really includes the child through adult stages.

Vinyl chloride risks are also presented in Table B.5-5 for the inhalation of vapors coming from groundwater assumed to be used for domestic purposes. The assumptions made in the calculation of these risks are presented in the report. In Table B.2-4, inhalation risks of 1.7×10^{-3} are presented for a child playing in Iguala Park, and these inhalation risks are represented as being the average of Stations 1, 2, and 3. Using the average concentration presented for these stations, we were unable to recreate the results presented in Table B.24. Because 95 to 99% of the inhalation risk at these three Stations is attributable to vinyl chloride,

understanding how vinyl chloride risks were calculated is important to understanding how the multi-pathway risks for the visitor to Iguala Park were calculated. In any case, it is it is inappropriate to calculate a separate risk for inhalation while visiting the park since the risks calculated for the various Air Monitoring Stations already assume a person would be exposed to vapors 24 hours per day.

Based on a conference call between ENVIRON and EPA on June 20, 1996 the Steering Committee understands that the method for calculating "Adult" risks was supposed to have assumed exposure for ages 0 to 29. However, as noted above, the assumptions used for calculating risks for all chemicals other than vinyl chloride do not include any assumption of childhood exposure. By calculating risks for vinyl chloride using the Cogliano theory, the "Adult" risks calculated for vinyl chloride include exposure throughout childhood. Thus, they are not directly comparable with the "Adult" risks calculated for other chemicals. It is not appropriate then to add the vinyl chloride "Adult" risks to the "Adult" risks calculated for the other chemicals detected at each monitoring station.

Separate risks are calculated and presented for "Child" risks (see Table BS-2). Because risks are calculated for childhood exposure under both the "Child" scenario and the "Adult" scenario, exposure to vinyl chloride by children has effectively been double counted.

Departures from standard exposure duration assumptions for childhood exposure scenarios apparently were made to accommodate the Cogliano theory for calculating vinyl chloride risks. These changes also introduced internal inconsistencies in the assumed exposure durations for children within the OII risk assessment. The duration of childhood exposure for exposure scenarios involving the inhalation of vinyl chloride risks was established as being 9 years. This exposure duration corresponds to the first two age categories (i.e., 0 to 5 and 6 to 9) in Dr. Cogliano's age-apportioned risk table (see Table B4-6). As shown in Table B3-3 an exposure duration of 9 years was assumed for the Residential Intake of Ambient Air. In contrast, an exposure duration of 6 years was used for childhood exposure to surface soil (Table B3-8). By increasing the exposure duration for the Residential Intake of Ambient Air under the child exposure scenario from the standard assumption of 6 years to 9 years to accommodate the needs of the Cogliano theory for vinyl chloride risks, the cancer risks for all other carcinogens are increased by 50%. Ambient air risks calculated for the child resident in the OII Baseline Human Health Risk Assessment are, thus, not directly comparable with risks calculated for the same scenarios in other risk assessments, in which more typical exposure duration assumptions are used. In addition, there is an internal inconsistency in that estimated risks for the child resulting from multipathway exposures to soil is based on an assumed exposure duration of 6 years. It appears, for example, that the multipath risks presented in Table B.2-4 for a child visiting Iguala Park is the sum of risks associated with 6 years of exposure to soil and with 9 years of exposure to ambient air.

Footnote c in Table B4-6 is not clear, appears to be misleading, and is not referenced in the Table. It should be deleted.

EPA's Response. Text presented in support of Comment 7 states that "[d]epartures from standard exposure duration assumptions for childhood exposure scenarios apparently were made to accommodate the Cogliano [approach] for calculating vinyl chloride risks ... The duration of childhood exposure ... Was established as being 9 years ... an exposure duration of 6 years was used for childhood exposure to surface soil..."

The calculation of risks for vinyl chloride inhalation included as part of the total multi-chemical risks presented in Table B5-2 were conducted assuming the following age groupings from Table B4-6:

- For Adult reasonable maximum exposure, all age groups from zero through 29 years
- For Child reasonable maximum exposure, all age groups from zero through 9 years
- For Adult average case, all age groups from 22 through 29 years

Special attention was given to the child component of the integrated exposure for inhalation because children are notably more sensitive to vinyl chloride. Nonetheless, the pathway is labeled as an "adult" pathway in the report.

The comment indicates a misunderstanding of EPA's intent regarding inclusion of the most sensitive periods of life into a typical Superfund reasonable maximum exposure residential scenario for inhaled vinyl chloride. EPA's intent was to utilize an reasonable maximum exposure residential scenario that included, in accordance with previously mentioned guidance, the most sensitive periods of life for individuals exposed to vinyl chloride by inhalation. Since cancer risks from inhaled vinyl chloride are inversely proportional to age during exposure, the 30-year default exposure duration for an reasonable maximum exposure residential scenario was defined as ages 0 to 29 years of life. (EPA acknowledges this could have been more clearly stated in the risk assessment.) Thus the "Adult reasonable maximum exposure " is an age-adjusted exposure scenario incorporating the most sensitive period of life for vinyl chloride cancer risks. Use of such an age-adjusted exposure scenario is consistent with risk assessment methodology routinely used by EPA in the development of Preliminary Remediation Goals (e.g., see Region IX Preliminary Remediation Goals tables) and is not unique to the OII Site risk assessment.

To illustrate the magnitude of the age-dependence of risks from inhaled vinyl chloride, risk estimates for the period 0 to 9 years of life were displayed separately in the risk assessment. This display represented the child component of the age-adjusted reasonable maximum exposure residential scenario. It is labeled "reasonable maximum exposure-Child" or "Child reasonable maximum exposure," which may be the cause of some of the misunderstanding.

The 0 to 9 year period of life was chosen for three reasons:

1) It represents an exposure duration consistent with national statistics on the average duration for residence, and hence the potential for at-home exposure, at any one location. The Exposure Factors Handbook presents an analysis of data on the number of years Americans live in one house and concludes "... the 50th ... percentile value for years living in the current home [was] determined to be 9.37 years ...". This value was rounded down to 9 years for the current assessment.

2) It is the default exposure duration assumption used for an average (i.e., central tendency) residential exposure scenario for Superfund risk assessment. This is in accordance with guidance presented in Risk Assessment Guidance for Superfund.

   The risk assessment therefore also uses a 9-year exposure duration for the adult average residential inhalation risk scenario (see Table B3-3).

3) Given the size, nature, history and demographics of the communities adjacent to the site, it is reasonable to assume there are a number of children 9 years or older who have lived there since birth.

EPA's intent in separately displaying risk estimates for the first 9 years of life was also to provide a better indication of the uncertainty and variability in the risk assessment by presenting a range of risk estimates for various different exposure scenarios and subpopulations, rather than a single point estimate of risk.

Although risk estimates for the first 9 years of life were displayed separately in the assessment, there was no "double counting" of risk since these values were not added to the age-adjusted reasonable maximum exposure risk estimates. Rather they are presented as separate independent risk estimates for a different and more sensitive period of life. Instead, these two scenarios should be viewed as assessments for two distinct exposure settings. The child reasonable maximum exposure asks "What is the potential risk if a child is exposed from 0 to 9 years?" Alternatively, the Adult reasonable maximum exposure asks "What is the potential risk if an adult has been exposed from 0 to 29 years?"

EPA recognizes that an error was made in calculation of risks for vinyl chloride reported in both Tables B5-1 and B5-2. This was the result of a unit conversion error. The risks estimated for vinyl chloride (but no other chemicals) should be approximately 6-fold lower than those reported in the tables. Because the ambient air risks were not a factor in selection of the remedy, correction of this error will not influence the outcome or conclusions of the Feasibility Study, Proposed Plan, or this ROD. Revisions to Tables B5-1, B5-2, B5-3, B.2-4 and Figure B5-1 and selected text have been made. Revised tables, figures, and text are included as Appendix C of this ROD.

The comment states that it is inappropriate to sum risks for soils with those for inhalation presented in Table B.2-4. The soil risks are not for a park visitor, as presumed in the comment, but for residences living near the park. Thus, it is not inconsistent to sum the air pathways risks with the soil risks, because both of these are for the same potentially exposed population.

Comment 7 also indicates an inability to "recreate the results presented in Table B.2-4" for ambient air exposure risks. This is due to two factors:

1) A misunderstanding of the term "Ambient Air - Average of Stations 1, 2 and 3" in the Table

2) The conversion factor error that was made in calculating ambient air risks from exposure to vinyl chloride for Table B5-2 (see above)

Table B.2-4 presents multipathway risks for a child reasonable maximum exposure at Iguala Park. It is not intended to present risks calculated for an average or central tendency exposure scenario. The term "Ambient Air - Average of Stations 1, 2 and 3" indicates that the individual reasonable maximum exposure risk estimates for Stations 1, 2, and 3 from Table B5-2 were averaged to obtain reasonable maximum exposure estimate for the Iguala Park location.

Because the vinyl chloride risk calculations contributing to the Table B5-2 ambient air risk estimates contain a conversion factor error (see above), this error was propagated to the Stations 1, 2, and 3 average calculated for Table B.2-4. The correct risk values for the child component of the residential reasonable maximum exposure scenario ("child reasonable maximum exposure) should be: 3.9×10^{-4} for Station 1, 3.6×10^{-4} for Station 2 and 1.2×10^{-4} for Station 3 yielding an average across all three stations of 2.9×10^{-4}. Thus, 2.9×10^{-4} should replace the value of 1.77×10^{-3} listed in Table B.2-4 for "Ambient Air - Average of Stations 1, 2 and 3."

It is true, as indicated in Comment 7, that a childhood component of risks from incidental soil ingestion was developed for the initial 6 years of life. This period was chosen because it has been demonstrated to be a period of life when incidental soil ingestion in children is significantly higher than at later ages. Inclusion of this factor is a standard risk assessment procedure used by EPA in the Superfund program and follows guidance in OSWER Directive 9285.6-03, Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors, March 25, 1991 (EPA, 1991f).

In contrast to the birth-to-9-year-old child risk estimate displayed for vinyl chloride, which illustrated risks during a highly sensitive period of life, this factor for soil ingestion was included in the risk assessment to account for a period of life when environmental exposure, and hence contaminant intake, are significantly higher. Agreement between the two age periods is not required because they are factored into the risk assessment for different purposes; one reflects a period of life when child contaminant intake is disproportionately high (incidental soil

ingestion), and other reflects a period of heightened sensitivity during early life (inhaled vinyl chloride cancer risks).

The footnote "c" from Table B4-6 referenced in the comment should have been attached to the value of 2.4×10^{-1} in the first row beneath the column headings in the table.

ARARs Comment No. 1. *There are no data or factual support provided in the ARARs section of the FS that outline the factors considered and/or the analysis EPA undertook in determining that certain requirements are ARARs; and, therefore, the Steering Committee is in many instances unable to evaluate the validity of EPA's determination that a particular requirement is an ARAR.*

Appendix C of the FS identifies certain ARARs as potentially "applicable or "relevant and appropriate" for the final remedy at the OII site. However, for the majority of the requirements so identified, the FS fails to provide any support for its determination. There are no data or factual support provided in Appendix C that outline the factors considered and/or the analysis EPA undertook in reaching its conclusion that certain requirements are ARARs. EPA guidance clearly states that the identification of ARARs is done on a site-specific basis and involves a two-part analysis: first, a determination as to whether a given requirement is applicable; then, if the requirement is not applicable, a determination as to whether it is nevertheless relevant and appropriate. Applicable requirements are those standards that specifically address a hazardous substance, remedial action, location or other circumstance at a CERCLA site because all jurisdictional prerequisites apply. Requirements that are applicable are not re-evaluated to determine if they are also relevant and appropriate.

The determination of relevance and appropriateness is made by comparing a number of factors at the specific site to those addressed in the requirement. In general, the determination should focus on the similarity between the circumstances or exposure scenario contemplated in the requirement and the circumstances or exposure scenario of the CERCLA site. The analysis of whether a requirement is "relevant and appropriate" includes a comparison between the site circumstances and the requirement based on: (1) the purpose of the requirement and the purpose of the remedial action at the site; (2) the physical characteristics (size/nature) of the site; (3) the media protected by the requirement and the media potentially/actually contaminated at the site and affected by the cleanup; and (4) the requirement's consideration of the ultimate use or potential use of the affected resource and the use/potential use of the affected resource at the site. A requirement may be "relevant" if it covers situations similar to that at the site, but it may not be "appropriate" because the requirement is not well-suited to the specific circumstances at the Site or is superseded by another applicable requirement. In such a case, the relevant requirement will not be an ARAR. Only those requirements that are determined to be both relevant and appropriate must be complied with. A detailed analysis and discussion of the rationale for identification of the requirements in the FS as potential ARARs was not provided. The Steering Committee, therefore, is in many instances unable to evaluate the validity of EPA's determination that a particular requirement is an ARAR.

Without a more complete explanation of the rationale for selection and application of the ARARs listed in the FS, the Steering Committee is also unclear as to (1) how EPA intends to use the identified ARARs, and (2) which specific requirements of a listed ARAR (e.g., Title 23, CCR, Article 5) EPA considers to be applicable to the remedy. For example, the Title 23 regulations for groundwater monitoring are very prescriptive, and different requirements may apply depending whether a site is, for example, in corrective action or detection monitoring. Certain of the specific prescriptive requirements of Title 23 may be inconsistent with the performance standard approach of the selected remedy and/or inappropriate under the circumstance of the OII Site. The application of any ARAR should be tailored to the specific conditions and circumstances at the site, and should be consistent with the performance standard approach of the proposed final remedy. EPA should more fully identify the rationale and analysis it used in selecting the specific ARARs it intends to apply to the OII final remedy, and explain the approach for use of these requirements in implementing the selected remedy. EPA's analysis must be presented in a way that allows for effective public review and comment. EPA's position in the FS that it is "listing" the range of potential ARARs in the FS, but that it will decide and identify the actual ARARs in the ROD preempts an opportunity for the public to understand, review and comment on EPA's selection of ARARs.

EPA's Response. Pursuant to the NCP, ARARs determinations are made in the ROD, rather than during the feasibility study. The Feasibility Study Report identified potential ARARs, based on the characteristics of the Site (as discussed in the Remedial Investigation and Feasibility Study Reports), and on the nature of the alternative remedies (as discussed in the Feasibility Study Report), and taking into consideration the potential ARARs identified by the California Department of Toxic Substances Control. The discussion in the Feasibility Study Report presented the rationale for identifying the potential ARARs. This discussion, within the context of the information in the Remedial Investigation Report, the Feasibility Study Report, the Proposed Plan, and other documents in the Administrative Record, provides the public with the basis to comment on the applicability, appropriateness, relevancy, and suitability of the potential ARARs. No comments were received questioning the basis for identification of any specific potential ARAR.

ARARs Comment No. 2. *The FS identifies multiple requirements governing similar conduct and circumstances as ARARs, and states that EPA will select, as the ARAR, the most stringent requirement among them. There is no legal authority or guidance of which the Steering Committee is aware - nor does the FS provide any such authority or guidance - establishing that it is within the agency's discretion simply to select the most stringent between an applicable requirement and relevant and appropriate requirements.*

EPA states repeatedly in the ARARs section that where a requirement is considered "applicable" and another requirement governing the same conduct is considered "relevant and appropriate," EPA will select as the ARAR the most stringent requirement between the two. This position is incorrect and inconsistent with EPA guidance. An applicable requirement, even if it is less stringent, should take precedence over any similar requirement that is "relevant."

For example, in the ARARs section in Section C1.3, EPA states that the interim status requirements are generally "applicable" to the final remedy, while the requirements for permitted hazardous waste landfills are generally "relevant and appropriate." Yet EPA states that it may not necessarily select the "applicable" requirement as the ARAR, but will select the "most stringent" requirement. As discussed below, not only is EPA's position here unsupported by law and its own guidance, but the practical implication of EPA's position is that the OII site could be subjected to inconsistent standards: in some instances, EPA may require interim status standards, while in other instances it could require permitted facility standards.

It is not unusual that multiple requirements are initially identified as being applicable or relevant, even though these requirements address similar issues or circumstances. EPA guidance provides for further screening of the "relevant" requirements to determine which requirements are "appropriate" and hence, an ARAR. Under EPA's ARAR guidance[4], "relevant" requirements should not be considered "appropriate" when

> *"...another requirement is available that more fully matches the circumstances at the site", or*
>
> *"...another requirement is available that has been designed to apply to that specific situation, reflecting an explicit decision about the requirements appropriate to that situation."*

[4] *See CERCLA Compliance With Other Laws Manual: Interim Final, August, 1988.*

Clearly, under the second criterion, explicitly applicable requirements take precedence over any relevant requirement that addresses similar situations. Furthermore, under the first criterion, EPA should further evaluate and select among overlapping "relevant" requirements based on a judgment as to which "more fully matches the circumstances at the site." Any other "relevant" requirements are not "appropriate" and are therefore not an ARAR. Stringency is not listed by EPA as an evaluation criterion.

EPA's Response. The Feasibility Study Report identified the CERCLA Compliance with Other Laws Manual (Interim Final), EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9234.1-01, August 1988 (ARARs Manual, Part I) (EPA, 1988k), and the CERCLA Compliance with Other Laws Manual: Part II, Clean Air Act and Other Environmental Statues and State Requirements (Interim Final), OSWER Directive 9234.1-02, August 1989 (ARARs Manual, Part II) (EPA, 1989f), as guidance followed by EPA in identifying potential ARARs. This guidance expressly states that where more than one standard applies, the Agency should generally select the most stringent standard. See, for example, page 1-59 of the ARARs Manual, Part I (regarding chemical-specific ARARs). This is consistent with the statutory mandate requiring selection of more stringent state requirements over federal requirements, found in CERCLA Section 121(d), 42 U.S.C. § 9621.

While it is true that the ARARs Manual suggests that a requirement that is not directly applicable may not be relevant if an applicable requirement is better suited to the circumstances at the site (see page 1-68 of the ARARs Manual, Part I), this should not be read to mean that an applicable requirement is always preferred over an appropriate and relevant requirement. A policy that automatically preferred applicable requirements to relevant and appropriate requirements would be inconsistent with the statutory mandate and would not serve the intended purpose of the statute. For example, a state requirement that is not applicable because of a jurisdictional date, but is more stringent than a federal requirement, must still be identified as an ARAR under CERCLA. Further, there is no basis for choosing a less-stringent applicable requirement over an equally well-suited relevant and appropriate requirement. EPA therefore believes that, in choosing between potential ARARs that are applicable or relevant and appropriate but equally well-suited to a site, it is consistent with law and guidance to select the most stringent requirements.

ARARs Comment No. 3. *The application of federal and state ARARs for landfill closure identified in the FS which relate to the control of landfill liquids should be based on the protection of off-site groundwater quality as a potential source to drinking water supplies.*

The FS describes the Perimeter Liquid Control in Alternatives 2, 3, and 4 as a "no-flow barrier" where the "landfill source would be cutoff." These and similar references in Appendix C of the FS seem to imply the remedy is expected to achieve total "containment" of landfill liquids. These references are ambiguous and misleading. EPA's OII Proposed Plan provides for the "control" of landfill liquids. This does not mean that total containment of all landfill liquids is necessary, or possible. The control of liquids at the landfill boundary is limited by the natural hydrogeologic complexities of flow pathways in the underlying aquifer system, particularly in the deeper Pico formation where the majority of groundwater flow (and associated landfill constituents migration) occurs through fractures and sand lenses in low permeability siltstone. In addition, the leachate and groundwater quality around the perimeter of the landfill are highly variable. In some areas, only minimal exceedances of MCLs, which EPA identifies as potential ARARs, have been observed. As a result, the level of control of landfill liquids necessary to protect the quality and beneficial use of off-site groundwater is equally variable. Recognizing these practical limitations, EPA's Performance Standard contemplates a scenario that would not achieve absolute containment, but would control landfill liquids "to prevent migration beyond the landfill boundary at levels that would result in MCL exceedances or elevated risk in downgradient areas".[5]

[5] *See OII Proposed Plan, Fact Sheet #24, Pg. 7, EPA, May 1996.*

Moreover, the state regulations for landfill closure and corrective action cited by EPA as ARARs (Title 22 CCR 66264.111 and 265.111) are not directed toward absolute containment of landfill liquids but seek to control, minimize, or eliminate post closure escape of hazardous constituents or leachate to the extent necessary to protect human health and the environment. Therefore, references to containment in the FS are misleading and inconsistent with these

regulations. The Record of Decision should clearly set forth the meaning of landfill liquids control.

EPA's Response. EPA agrees that the protection of off-site groundwater quality as a potential source of drinking water supplies is a factor to be considered in identifying relevant and appropriate requirements. The 1995 Water Quality Control Plan for the Los Angeles Region (known as the "Basin Plan") designates the groundwater surrounding the OII Site as potential drinking water. In the ROD, EPA has identified MCL drinking water standards (and health-based standards where no MCLs exist) as a relevant and appropriate requirement. The ROD requires perimeter liquids control where contaminants are migrating to groundwater at levels causing groundwater to exceed these standards. The point of compliance for these standards is established pursuant to applicable hazardous waste landfill requirements, as discussed below and in the ROD.

ARARs Comment No. 4. *As a practical location for monitoring the efficacy of the groundwater remedy at the OII landfill, where releases are indicated to already have occurred, a POC at the landfill boundary has significant limitations and is not appropriate for determining the effectiveness of an off-site groundwater remedy based on natural attenuation. An alternative monitoring boundary should be established beyond the edge of the landfill at a point where more meaningful groundwater quality comparisons can be made.*

As set forth in Appendix C, the point of compliance ("POC") is defined in the hazardous waste water quality monitoring regulations[6] as the hydraulically downgradient limit of the waste management unit ("WMU"), extending through the uppermost aquifer underlying the regulated unit. As set forth below, the POC as EPA apparently would define it, is not a feasible location at the OII site from which to evaluate the progress of the natural attenuation groundwater remedy.

[6] EPA cites Title 22 CCR sections 66264 and 66265 and Title 23 CCR Article 5 as potentially applicable or relevant and appropriate regulations.

The groundwater monitoring requirements in the hazardous waste regulations cited in Appendix C are designed principally to apply to WMUs that have not yet had a release -- in other words, the water quality monitoring requirements are oriented toward the early detection of releases from WMUs at new and/or operating facilities. These regulations call for a POC at the edge of the WMU. As a practical location for monitoring the efficacy of the groundwater remedy at the OII landfill, which has been closed since the early 1980s, and where releases are indicated to already have occurred, a POC at the landfill boundary has significant limitations and is not appropriate for determining the effectiveness of EPA's proposed remedy, which relies on natural attenuation and other components of CD-3. Foremost among these limitations is the fact that concentrations of some landfill constituents at the edge of the landfill already exceed the chemical-specific ARARs cited by EPA (e.g., MCLs) and EPA acknowledges that they will continue to exceed these limits for a number of years before they are expected to decrease as a result of remedial actions that will be conducted at the Site. Under these

circumstances, a POC at the edge of the landfill that will be used to make comparisons to background concentrations or MCL is not a reasonable strategy for evaluating the effectiveness of the remedy, especially in the relative short-term. For practical purposes, therefore, an alternative "POC," which we would refer to as a "remedy effectiveness point" ("REP"), should be established beyond the edge of the landfill at a point where meaningful groundwater quality comparisons to health-based cleanup goals and/or MCLs can be made. This REP should be used for the period of time that landfill constituents in groundwater at OII will naturally attenuate. Over the longer-term, the REP could be adjusted closer to the landfill as the groundwater quality data in this area improves.

The Steering Committee believes that, to the extent the FS identifies the regulations in the California Code of Regulations Titles 22 and 23 as ARARs, EPA should specify that (1) an off-site REP will be used for the purposes of monitoring the effectiveness of the remedy on off-site groundwater quality, and (2) off-site groundwater quality is not required to comply with any chemical-specific ARAR for groundwater until the "corrective action" is deemed complete. An off-site REP not only is necessary for effectively monitoring the off-site component of the groundwater remedy, as discussed above, but also is appropriate because of the complex hydrogeologic nature of the Site, the lack of any apparent risk of exposure and the lack of any apparent potential for use of groundwater near the OII Site. These factors were identified in the FS as reasons for setting Concentration Limits for the groundwater remedy at levels that exceed background. As discussed further below, these same factors are appropriate for establishing an off-site REP.

First, exposure to constituents in groundwater from the OII site is virtually nonexistent. Groundwater quality in the vicinity of OII poses no threat to the current or anticipated future designated beneficial uses of groundwater in the area. The low permeability of the underlying aquifer zones at OII and the natural attenuation of landfill constituents in groundwater severely limit the potential for migration of these constituents to the regional groundwater basins at concentrations that would pose a health risk, exceed MCLs, or in any other way interfere with the beneficial use of groundwater in the area during the period in which natural attenuation of groundwater will likely occur. Moreover, groundwater in the vicinity of OII is not currently used for drinking water and is not a feasible source for drinking water in the future because of high natural concentrations of constituents like arsenic, and the limited permeability and water available of the deeper Pico formation. There are no groundwater wells in the vicinity of OII, and water for residential and commercial use is supplied by municipal water companies whose sources of water are not affected or threatened by the OII site. There are substantial institutional and legal controls, including strict regulations on well installation and groundwater use, which also will prevent future exposure to any impacted groundwater. An off-site REP established during the period required for the natural attenuation of the groundwater to occur is entirely consistent with the protection of human health and the environment in the vicinity of the OII landfill.[7]

[7] The NCP-the only source of guidance on alternate points of compliance-provides that in determining compliance with remediation goals "performance shall be measured at appropriate locations in the groundwater..." 40 CFR section 300.430(c)t2)(1)(F). EPA acknowledges that

an alternative POC may also be protective of public health and the environment under site-specific circumstances, and that where there would be little likelihood of exposure, alternate points of compliance may be considered. Id. at 8734, 8753.

In addition, the State regulations which EPA cites (22 CCR Sections 66264.99(d)(2) and 66265.99(d)(2)) also provide a regulatory basis for establishing an alternate point of compliance. These sections require that, for a corrective action program, the owner/operator of the facility propose a Water Quality Protection Standard (WQPS) which includes the landfill constituents, the concentration limit, and the point of compliance for the corrective action program. Therefore, an alternate point of compliance could be proposed as part of the WQPS.

Whether or not an alternative POC (or REP) beyond the edge of the landfill is established, another critical requirement to specify is the "monitoring benchmarks" or concentration limits that will be used to evaluate the effectiveness and progress of the groundwater remedy. The proposed groundwater attenuation remedy will be a long-term remedy, and groundwater quality will slowly improve. EPA data indicates concentrations of some landfill constituents exceed MCLs at the edge of the landfill and in off-site areas. Therefore, water quality data from the edge of the landfill, which EPA appears to identify as the regulatory POC in the FS, will be of limited value in evaluating the effectiveness of the groundwater remedy because such data will likely continue to show exceedances of MCLs. EPA predicts such exceedances to continue for a number of years after the remedy is implemented. Appropriate monitoring benchmarks must therefore be established at the designated POC to evaluate how well the remedy is working, but which will not trigger further evaluation and remedial action without allowing the natural attenuation remedy an opportunity to work.

EPA's Response. The point of compliance is established as a vertical plane at the hydraulically downgradient boundary of the waste management unit, pursuant to applicable hazardous waste landfill requirements. Pursuant to EPA guidance, the groundwater performance standards must be met at the point of compliance at the completion of the remedy. EPA does not agree that the hazardous waste landfill requirements establish this point of compliance only for landfills where no releases have taken place. EPA agrees, however, that additional monitoring points are appropriate to measure the progress of remediation. The applicable regulations require a monitoring plan to evaluate the effectiveness of remediation. The plan will be developed during the remedial design process

ARARs Comment No. 5. *Because of the absence of any risk from exposure to landfill constituents in groundwater, all of the Alternatives considered in the FS provide for the achievement of chemical-specific ARARs in off-site areas within a reasonable time frame.*

EPA states in Section 6.6.1 of the FS that "Alternative 1 would not meet chemical-specific ARARs...with a reasonable time frame." Elsewhere in Table 6-4 of the FS, EPA states that Alternatives 2, 3, and 4 may not meet chemical-specific ARARs pertaining to groundwater cleanup in the southwest area within a reasonable time frame. These statements are misleading to the extent that they imply that there will be any potential risk of exposure from the landfill or any threat to human health or the environment within the time frame expected to meet ARARs.

In other words, Alternative 1, which relies on natural attenuation to reduce the concentration of landfill constituents in groundwater, may take longer to meet chemical-specific ARARs, but the difference in the time frame to meet such ARARs between Alternative 1 on the one hand, and Alternatives 2, 3, and 4 on the other hand, would have no effect on risk or exposure from groundwater at the Site. Indeed, it should be pointed out that Alternative 1 may, in fact, not take materially longer to reach chemical-specific ARARs, because it will, by necessity, require the collection of some landfill liquids and virtually all landfill gas at the landfill perimeter. It is further expected that biodegradation, dispersion, dilution, adsorption and complexing/precipitation -- the processes of natural attenuation -- will effectively reduce any remaining contaminants in off-site groundwater in a time frame comparable to that which could be achieved by a more active restoration approach.

In the groundwater policy discussion of the NCP, EPA states that "reasonable restoration time periods" may vary and that "if there are other readily available drinking water sources of sufficient quality and yield that may be used as an alternative water supply, the necessity for rapid restoration is reduced" (55 Fed. Reg. at 8734). As discussed elsewhere in detail in these FS comments, there are no drinking water wells in the area of OII and, based on the hydrogeology of the area and the significant institutional controls already in place, there is very little, if any, possibility that drinking water wells could ever be installed or used as a source of water supplies. The current sources of drinking water in the area of the OII site are sufficient to supply all the foreseeable water needs in the area, and there is no exposure, or risk of exposure, to groundwater at the OII site. Consequently, factors identified in the FS for favoring Alternatives 2, 3, and 4 over Alternative 1 for more rapid cleanup of groundwater are not present here.

Due to the limitations of the effectiveness of groundwater extraction systems, EPA acknowledges that active groundwater restoration may not always be able to achieve the final increment of cleanup (MCLs) in a time frame that is reasonable (55 Fed. Reg. at 8734). Moreover, although EPA asserts in the FS that a groundwater extraction system, as contemplated by Alternative 4, may shorten the time period in which the groundwater would meet MCLs, the agency's own hydrogeologic data indicate that groundwater recovery is not sufficient to effectively contain or control groundwater to any greater degree than the approach in Alternatives 1 or 2, and that the level of effort and cost to shorten that time period far outweighs the potential risk of exposure corresponding to implementation of a longer-term groundwater quality attenuation remedy. Therefore, a potentially extended remediation time frame for groundwater is appropriate at OII.

EPA's Response. EPA does not believe that all of the alternatives achieve ARARs in a reasonable time frame. Alternative No. 1 would allow contaminants to continue to migrate from the landfill and cause groundwater to exceed performance standards. This contamination would continue to occur for an unpredictable length of time. The time required to meet groundwater performance standards at the point of compliance is unknown, due to this uncertainty, but can be reasonably expected (based on the information developed and presented

in the Remedial Investigation and Feasibility Study Reports) to be many decades more than any of the other alternatives at a minimum. This period could well extend to a time in which the use of the water resources in the OII Site vicinity may be desirable or necessary. EPA does not believe that an unpredictable period that will significantly exceed the longest cleanup times projected under any of the other alternatives is a reasonable time frame to achieve ARARs.

ARARs Comment No. 6. *The Gas Migration Control and Landfill Cover ROD, incorporated into Appendix C of the FS, requires a destruction removal efficiency (DRE) of 99.99% for landfill gas, based on a determination by EPA that RCRA Subpart O is an ARAR. This determination by EPA was inconsistent with relevant NCP and EPA guidance and is unnecessary to protect public health. Consistent with current EPA and state regulations, landfill gas should be flared.*

EPA has explicitly incorporated the requirements of the 1990 Gas Migration Control and Landfill Cover Record of Decision (the "1990 Gas Control ROD") into all four of the Alternatives considered in the FS as potential final remedies at OII. Specifically, each alternative incorporates the elements of CD-3 for landfill gas (LFG) control and destruction and the final remedy will require long-term operation and maintenance of the LFG control system, which currently is expected to include a thermal destruction facility (TDF), operating at a DRE of 99.99%. The DRE required by the 1990 Gas Control ROD was apparently based on the determination by EPA that the RCRA Subpart O regulations for operation of hazardous waste incinerators were an ARAR, relevant and appropriate to the destruction of LFG at OII. For the reasons outlined below, in particular, more recent rulemaking, the Steering Committee believes it is appropriate for EPA to reconsider its prior decision on LFG destruction.

LFG is produced naturally by the aerobic and anaerobic decomposition of refuse in municipal solid waste (MSW) landfills. LFG is primarily composed of equal parts of methane and carbon dioxide with minor gaseous constituents including a wide variety of chlorinated and aromatic hydrocarbons. These minor constituents are present in virtually all LFG as a result of the biodegradation of materials found in landfills, including plastics and other household and commercial wastes. In some MSW landfills such as OII, industrial wastes were also historically disposed. These wastes are another source of the minor constituents detected in LFG.

Vinyl chloride was cited by EPA in the FS as a Constituent of Concern at the OII landfill. Vinyl chloride, a degradation product of chlorinated organic compounds, is widely present at trace concentrations in LFG from MSW landfills, as documented by testing performed by the State of California in 1987. This testing was conducted under the Calderon program (AB3374) and included ten potentially toxic constituents: vinyl chloride, benzene, ethylene dibromide, ethylene dichloride, methylene chloride, perchloroethylene, carbon tetrachloride, 1,1, l-trichloroethane, trichloroethylene, and chloroform. The results of this testing program were summarized by the California Air Resources Board (CARB) staff, and are published in a CARB report dated September 13, 1990. A summary of the average detected concentration of vinyl

chloride in LFG for the top ten landfills tested in 1987 by CARB (ranked by vinyl chloride concentration) is shown below in Table 1.

Landfill Name	*APCD*	*Hazardous Waste Accepted?*	*VC (ppm)*
Clovis	*Fresno*	*N*	*71*
John Smith	*Monterey Bay*	*Y*	*60*
BKK	*SCAQMD*	*Y*	*48*
Valley Center	*San Diego*	*N*	*43*
Kirby Canyon	*BAAQMD*	*N*	*41*
Fallbrook	*San Diego*	*N*	*32*
Calabasas	*SCAQMD*	*Y*	*30*
McClellan #C-8	*Sacramento*	*N*	*24*
Marina	*Monterey Bay*	*N*	*22*
San Marcos II	*San Diego*	*N*	*18*

Vinyl chloride was detected in 1988 in the LFG that is fed to the existing flares at OII at a concentration of 7 ppmv. More recent (1992) tests of LFG at the OII flares did not detect vinyl chloride at detection limits of 2.5 to 25 ppmv. Although OII was not among the landfills tested by CARB in the Calderon program, the vinyl chloride concentrations detected in LFG at OII (7 ppmv) would have ranked 27th of the landfills in the CARB database (i.e., at least 26 landfills in California have vinyl chloride concentrations higher than OII). A survey conducted by ENVIRON of the supervising Air Pollution Control Districts (APCDs) indicates that none of these 26 landfills have an LFG destruction device required to obtain a DRE of 99.99%. Based on ENVIRON's survey, the LFG at many of these landfills is not even collected. Where LFG is collected, it is destroyed in a flare, I.C. engine, boiler, or turbine. Based on ENVIRON's survey of APCDs, LFG, including gas from landfills that historically accepted co-disposed industrial and/or hazardous waste, is not regulated by EPA or the State of California as a hazardous waste, and is not required to be incinerated to a DRE of 99.99%.

The control and destruction of LFG emissions from MSW landfills is currently regulated at the federal level by regulations promulgated under the Clean Air Act. These regulations (40 CFR 60 Subpart WWW) require MSW landfills emitting greater than 150 megagrams per year of nonmethane organic compounds (NMOCs) to design and install gas collection and recovery systems and to combust the captured LFG. In the preamble to the proposed Subpart WWW regulation (56 FR 24468, May 30, 1991) EPA states that the pollutant to be regulated is "municipal solid waste landfill emissions" comprised of collection of air pollutants, including methane and NMOCs, some of which are toxic.

The standards for controlling LFG under Subpart WWW include: (1) a well-designed and well-operated gas collection system, and (2) a control device capable of reducing NMOCs in the collected gas by 98%.[8] It is important to note, however, that the Subpart WWW regulations only apply to landfills that are constructed, reconstructed or modified after the rule was initially

proposed (May 30, 1991). LFG from OII and other former co-disposal landfills (i.e., MSW landfills that were also used for the disposal of industrial and/or hazardous waste) is not explicitly regulated by EPA under Subpart WWW of the CAA. As such these regulations are not applicable to OII, which closed in 1984, but are potentially relevant and appropriate since these regulations are explicitly designed to apply to the same substances and materials (LFG containing NMOCs) and type of facility (a MSW landfill) that are regulated under Subpart WWW.

[8] *Control devices cited by EPA as potentially capable of meeting this DRE include flares, internal combustion engines, and gas turbines.*

LFG emissions from MSW landfills are also regulated by the State of California through the regional APCD or Air Quality Management Districts (the "AQMD"). On September 13, 1990 the California Air Resources Board (CARB) published a suggested control measure (SCM) as guidance to the APCD/AQMDs that have made commitments in their air quality management plans to reduce emissions of ozone precursors by controlling LFG emissions. APCD/AQMD rules based on the SCM specify the review and potentially the installation of LFG collection systems at new, active and inactive landfills having more than 500,000 tons of waste in place. The LFG destruction device would be required to have a 98% destruction efficiency. The SCM requires both surface integrity testing and control efficiency device testing. Although the SCM was originally intended to be a toxics control measure, the available data on the composition of LFG indicates it is a measure primarily reducing emissions of ozone precursors. District rules which implemented this state guidance may be considered to be potentially "relevant and appropriate" under the NCP.

Consistent with the SCM guidance the South Coast Air Quality Management District (SCAQMD) also has adopted Rule 1150.2, which addresses the collection and control of LFG at inactive landfills. The SCAQMD is directed under this rule to determine whether the gas generated from an inactive landfill needs to be collected. If so, the landfill owner is required to install an LFG collection system approved by the SCAQMD's Executive Officer. This rule was identified as an ARAR for LFG control in the 1990 Gas Control ROD.

LFG is not regulated as a hazardous waste under RCRA, or comparable state hazardous waste regulations. In order for a waste to be considered a hazardous waste, and therefore subject to RCRA regulation, it must first be determined to be a solid waste (40 CFR 260, Appendix I). Solid wastes include garbage, refuse, sludge, or other materials that are solid, liquid, semi-solid, or contained gases. LFG is clearly not a "contained gas" as defined under RCRA regulations and therefore, cannot be classified as a solid or hazardous waste under RCRA.[9] RCRA Subtitle C regulations (40 CFR 260-270) only apply to solid wastes that are explicitly listed in the regulations as a hazardous waste, or that otherwise exhibit characteristics of a hazardous waste.[10] Because LFG is not a solid waste, it cannot be a hazardous waste. Similarly, LFG cannot be considered to be a hazardous waste under the RCRA "mixture rule" (40 CFR 261.3 iii and iv) because these rules only apply to mixtures of solid and hazardous wastes. Accordingly, EPA does not regulate LFG as a hazardous waste under RCRA, and EPA

has not adopted any explicit regulations under RCRA for the collection and destruction of LFG or other gaseous emissions at MSW co-disposal landfills.

[9] 40 CFR 260.10 defines a "container" as "...any portable device in which a material is stored, transported, disposed of or otherwise handled." Clearly, a landfill or LFG recover system is not a "portable device" and hence, LFG is not a contained gas, as defined under RCRA regulation, when collected and managed using conventional recovery well, piping, and flares as is currently done at OII.

[10] The only hazardous waste characteristic that might even be theoretically applicable to LFG is the test for ignitability (40 CFR, Part 261.21). Even if ignitable, however, LFG must be compressed and in a "container" to be considered a solid/hazardous waste under this criterion.

EPA has adopted regulations under RCRA, however, for control of organic air emissions from tanks, surface impoundments, and containers used for the storage, disposal, or treatment of hazardous wastes (40 CFR 264, Subpart CC). These rules require 95% control and destruction of volatile emissions from certain regulated hazardous management units. Although in the preamble to the Subpart CC regulations EPA noted that this rule is not likely to be "applicable" to landfills, it further noted that in some instances, the ***"basic process and air emission mechanism"*** *may be similar to surface impoundments and* ***"in some cases, the Subpart CC standards may be relevant and appropriate for such actions"*** *(59 FR 62903, December 6, 1994).*

It is clear in both EPA's discussion of the potential use of Subpart CC as an ARAR and in its ARAR Guidance[11] that it intends to only identify and select RCRA regulations as ARARs in circumstances that very closely match the circumstances (e.g., type of facility, media regulated and substances) that are the subject of the RCRA requirement. While EPA noted that Subpart CC may not be "applicable" to landfills, Subpart CC may at least be a regulation "To Be Considered" in the adoption of a performance standard for destruction of LFG. It certainly more closely resembles the circumstances at OII than any of the RCRA regulations that were cited in the 1990 Gas Control ROD to select the LFG destruction requirements for the Site. In any case, EPA has explicitly determined that the control and destruction of volatile emissions from many hazardous waste management units at RCRA facilities should be 95%. This level of control is consistent with earlier rule making under 40 CFR 264 Subpart AA regarding leaks or emissions from process vents at hazardous waste facilities. Together, these two rules establish a consistent position by EPA on the control of volatile emissions from RCRA units. It is particularly important to note that EPA does not require the destruction of volatile emissions from RCRA units in accordance with RCRA Subpart O incinerator performance standards in any of these rules.

[11] See CERCLA Compliance with Other Laws Manual, Interim Final, August 8, 1988.

Furthermore, in Exhibit 1-3 of its ARAR Guidance, EPA lists certain "Selected, Action-specific Potential Applicable or Relevant Appropriate Requirements" for various remedial actions commonly implemented at Superfund sites. For a "gas collection" remedial action, EPA cites Clean Air Act requirements as potential ARARs. No RCRA requirements are cited as potential ARARs for this type of remedial action. Conversely, for "incineration" remedial actions, EPA states that a prerequisite for applicability is a determination that the material to be incinerated

is a RCRA hazardous waste. In identifying these potential action-specific ARARs, EPA clearly intended to regulate LFG in accordance with the then soon-to-be promulgated rules under the CAA, not under RCRA. There is no information provided in Exhibit 1-3 of the ARAR Guidance that indicates EPA ever intended to apply the RCRA Subpart O incineration regulations to the destruction of LFG.

The EPA ARAR Guidance requires that the agency obtain clear documentation that the subject waste is hazardous in order for RCRA requirements to be applicable.

> *"If the lead agency is unable to make an affirmative determination that the wastes are RCRA hazardous wastes, RCRA requirements would not be applicable to CERCLA actions, but may be relevant and appropriate if the CERCLA action involves treatment, storage or disposal and if the wastes are similar or identical to RCRA hazardous waste." (ARAR Guidance p.2-5)*

In this case, LFG clearly is not regulated as a hazardous waste under RCRA and EPA has not adopted any explicit RCRA regulations for the control of LFG from co-disposal landfills. Even if EPA can demonstrate that listed RCRA hazardous wastes were disposed of at OII, the volatile gaseous emissions from these wastes are not a hazardous waste, or regulated by RCRA, except to the extent EPA has adopted explicit emission control regulations such as Subpart CC. EPA has already determined that Subpart CC is not applicable to landfills, and, in any case Subpart CC does not require a DRE of 99.99%. RCRA regulations, therefore, are not applicable to the control and destruction of LFG at OII.

The determination whether a RCRA regulation may be "relevant" to the destruction of LFG at OII requires a somewhat more subjective analysis. The EPA ARAR Guidance, however, is clear that RCRA rules should only be applied as ARARs in CERCLA actions when the circumstances "closely resemble" the specific circumstances addressed by the original RCRA regulation. Factors that are considered in determining the relevance" and "appropriateness" of RCRA regulations include:

- *Media regulated/affected by the requirement; and*
- *Substances covered by the requirement; among others.*

In this case, the media in question, LFG, is not a solid and/or hazardous waste regulated by RCRA. Subpart O incinerator rules are only intended to apply to the incineration of hazardous wastes, not uncontained gases like LFG. Although the Subpart O incinerator rules regulate the destruction of organic constituents in hazardous waste, including some of the same constituents detected in LFG, the EPA ARAR Guidance notes that the presence of these constituents in LFG is not sufficient to establish the relevance or appropriateness of Subpart O as an ARAR.

"...the mere presence of hazardous constituents in a CERCLA waste does not mean the waste is sufficiently similar to a RCRA hazardous waste to trigger Subtitle C as an ARAR" (ARAR Guidance p. 2-6)

At the very least, EPA's ARAR Guidance notes in order to establish that RCRA regulations would be relevant and appropriate to the destruction of LFG, EPA must first establish that LFG is, or closely resembles, a RCRA regulated hazardous waste.

"Judgment should be used in assessing whether the waste closely resembles a RCRA hazardous waste, considering the chemical composition, form, concentration, and any other information pertinent to the nature of the waste." (ARAR Guidance p.2-6)

LFG is a mixture of methane, carbon dioxide and trace concentrations of other organics. LFG does not even remotely resemble any materials regulated under RCRA as a hazardous waste. On this basis alone, therefore, EPA should have determined in the 1990 Gas Control ROD that RCRA Subpart O requirements are not "relevant" to the destruction of LFG at OII. The EPA ARAR Guidance further discusses the various factors that should be considered in the analysis to determine which of the "relevant" requirements may be "appropriate." Foremost among these factors in this case is:

"whether another requirement is available that more fully matches the circumstances at the Site." (ARAR Guidance p. 1-67)

Clearly, EPA has made a determination that LFG should be regulated under the Clean Air Act. The LFG destruction device specified by both the state of California and the Federal New Source Performance Standard is a flare or other device capable of a destruction efficiency of 98% for NMOCs. As a practical matter, tests of flares operating at landfills have shown destruction efficiencies greater than 98% for toxic constituents, in particular, vinyl chloride in LFG. Tests, for example, of the operating flares at BKK's landfill in West Covina, CA (like OII, a former RCRA interim status co-disposal landfill) have shown in data provided to the SCAQMD that vinyl chloride is destroyed in excess of 99.9%. Flares have been consistently applied to destroy LFG at operating and closed landfills throughout California. Under EPA ARAR Guidance, therefore, state (APCD) and federal (Subpart WWW) rules for control and destruction of LFG could be determined to be "relevant and appropriate" for the control and destruction of LFG at OII.

EPA did not justify its decision to amend the original 1988 ROD for LFG control, which specified flaring, on the basis that a higher DRE was necessary to protect public health near OII. In fact, EPA determined in 1988 that LFG flaring was sufficiently protective of public health to comply with all Superfund requirements. In light of this prior determination by EPA, the 1990 Gas Control ROD amendment to provide 99.99% destruction of LFG through incineration does not provide any meaningful greater increment of public health protection, since the public was already adequately protected through the on-going flaring of LFG. In

addition, the emissions from a LFG destruction device (e.g., a flare) is a buoyant plume that will rise and effectively disperse into the atmosphere. There is little potential, therefore, for direct exposure to the de minimis emissions from a landfill flare by residents near OII.

Consequently, it is the Steering Committee's position that EPA incorrectly identified the RCRA Subpart O Incinerator Performance Standards as an ARAR for LFG destruction at OII in the 1990 Gas Control ROD. In light of the more relevant and appropriate federal and state regulations adopted since the 1990 Gas Control ROD decision, EPA should identify Subpart WWW regulations adopted under the Clean Air Act as potentially Relevant and Appropriate and the Subpart CC regulations as "To Be Considered." Consistent with these regulations, LFG at OII should be flared.

The Steering Committee's comment that RCRA Subpart O should not be an ARAR for LFG destruction is properly raised in its comments to the OII Final Remedy FS. First, while the 1990 Gas Control ROD is considered a final ROD, the gas control remedy is incorporated in the FS as part of the Final Remedy for the Site. Secondly, the Final Remedy itself expressly includes and the FS directly addresses the long-term operation and maintenance component of the gas control system. (FS, p. 2-15.) Consequently, the information discussed in this comment, particularly in light of the fact that it was not available at the time the 1990 Gas Control ROD was issued, is properly raised as a comment on the FS and should be addressed by EPA during its preparation of the Final Remedy ROD.

Admittedly, however, the situation presented here does not fit squarely within the applicable law and guidance on ROD revisions.[12] Because this could potentially be seen, at least in part, as revising a final ROD, it may be that a two-prong, "hybrid" approach --using both the FS and the 1990 Gas Control ROD -- is the most appropriate means of accomplishing the reconsideration and revision of the incinerator requirements as an ARAR for the LFG control system.

[12] *"Guidance on Preparing Superfund Decision Documents," EPA/540/G-89/007, July 1989.*

With regard to revising the 1990 Gas Control ROD, the information in this comment meets the NCP criteria for EPA reconsideration of a component of a ROD: the comment contains significant information, the information is not contained elsewhere in the administrative record, the information was not available at the time the 1990 Gas Control ROD was issued, and, therefore, could not have been submitted during the public comment period on the 1990 Gas Control ROD, and the information substantially supports the need to alter the scope of the destruction component of the LFG control system. (40 CFR Part 300.825(c).)

In this instance, the appropriate procedure for amending the 1990 Gas Control ROD would be for EPA to issue an Explanation of Significant Differences (ESD) because the proposed change to the ROD is most appropriately classified as a significant change --one in which an incremental change is being made to a component of a remedy that does not fundamentally

alter the overall remedial approach. (42 U.S.C. section 117(c); 40 CFR Part 300.435(c)(2)(I).) As discussed above, the change in the DRE is based on information made available since the 1990 Gas Control ROD was issued, including but not limited to, newly promulgated requirements that more closely resemble the circumstances at the OII site. The change would not fundamentally alter the remedy selected in the 1990 Gas Control ROD as to scope, performance or cost. Moreover, the change would not significantly, if at all, affect the effectiveness or protectiveness of the remedy selected in the 1990 Gas Control ROD. Indeed, as the comment points out, there are no other similar landfills in the State that have been subject to Subpart O standards for remedial action.

In light of the substantial support for revising the incinerator requirement in the 1990 Gas Control ROD, the Steering Committee believes that the procedural approach outlined above satisfies the legal criteria for reconsidering the requirement and furthers the "spirit" of EPA guidance on documenting such changes, while at the same time fits the practicality of the complex and unique circumstances at OII.

EPA's Response. The Gas Control and Cover ROD is a final ROD, and is not incorporated, reselected, modified, or amended by this ROD in any way. The Gas Control and Cover ROD was included in the Feasibility Study for reference only, as the alternatives considered in the Feasibility Study assumed conditions established by implementation of that ROD. This is consistent with the Gas Control and Cover ROD itself, which states that "[t]he Gas Control Remedial Action will be integrated with the final site remedy." Gas Control and Cover ROD, page "i" (found in the Declaration section of the original ROD, prior to its amendment to include the landfill cover). Long-term operation and maintenance of the systems required by the Gas Control and Cover ROD are also solely addressed by that ROD; however, it is true that the Third Partial Consent Decree does not provide funding for the costs of this operation and maintenance. Pursuant to the NCP, 40 CFR § 300.430(f)(1)(ii)(B), the remedial actions selected by the Gas Control and Cover ROD must achieve the ARARs identified at the time of the signature of that ROD. ARARs may only be waived under the conditions specified in the NCP, 40 CFR § 300.430(f)(1)(ii)(C). The NCP only allows ARARs to be modified if EPA determines that the new requirements are "necessary to ensure that the remedy is protective of human health and the environment," 40 CFR § 300.430(f)(1)(ii)(B)(1). If a component is not described in the ROD, but is added pursuant to a ROD amendment or an explanation of significant differences, then the component must meet the ARARs identified at the time of signature of the amendment or of the explanation of significant differences, 40 CFR §300.430(f)(1)(ii)(B)(2). The elements of the Gas Control and Cover ROD addressed by the comment were included as components of that ROD and, again, were not reselected, modified, or amended by this ROD in any way. It would therefore neither be appropriate nor consistent with the NCP to review the ARARs for these elements of the Gas Control and Cover ROD. Furthermore, EPA continues to believe that the requirements selected in the Gas Control and Cover ROD are well suited to landfill gas contained in collection systems at the OII Site, considering the "contained-in" policy applicable to listed wastes as well as the characteristics of the gas.

Attachment B - *Groundwater Exposure Pathway Analysis.* Prepared by ENVIRON Corporation for David Giannotti, Esq., Howrey & Simon, dated November 1995

This report was submitted as Attachment B to the OII Steering Committee comments. The full report is included in the Administrative Record, and has not been repeated here. Much of the report simply expands on discussions of topics EPA had previously addressed in the Draft Remedial Investigation Report (EPA, 1994c). EPA responses to the key issues in the report are provided below.

Attachment B Comment No. 1 (page 3-7). *Using CH2M HILL's estimates of rate of groundwater migration, the zone of potential groundwater (and landfill constituent) migration in the Unconfined Aquifer has been estimated, and is depicted on Figure 3.4. This estimate is based on the mid-range estimate of groundwater migration rates in the southwest, northwest, and east areas.*

EPA's Response. As described in the Draft Remedial Investigation Report (EPA, 1994c), much higher groundwater migration rates than those shown in Figure 3.4 could occur along preferential pathways through the siltstone in the Southwest Area (e.g., in more permeable, sandier intervals or along fractures).

Attachment B Comment No. 2 (page 4-1). *It is not uncommon, when monitoring wells are first sampled at a site such as OII, that landfill constituents are detected in groundwater.*

EPA's Response. It is not clear what is meant by this statement, but the implication is that contaminants detected in initial sampling events from a monitoring well are not valid. In some instances, early sampling events may be more indicative of actual groundwater conditions because the aquifer has not been exposed to the oxygen-rich atmosphere (oxygen is introduced to the aquifer through the monitoring well). This exposure can change the oxidation-reduction conditions in the aquifer in the vicinity of the well and, thus, impact constituents concentration.

Attachment B Comment No. 3 (page 4-2). *If, in fact, groundwater at a monitoring well is contaminated by constituents from the OII landfill, these constituents should be detectable consistently and repeatedly during multiple sampling events. Groundwater at the OII site has been shown to move very slowly in many areas, and groundwater quality changes are equally slow. It is highly unlikely, therefore, that a landfill constituent could be detected in one sampling event and not in subsequent sampling events if, in fact, it was present in groundwater.*

EPA's Response. Although EPA agrees that there should be a level of consistency in the contaminants observed at a well over an extended period of time, EPA does not completely agree with the claims that a contaminant that is not detected in successive sampling events is not present in groundwater. Variability in contaminant distribution is expected at the OII Site because of a number of factors, including:

- A variable contaminant source, both spatially and temporally, that impacts the observed distribution of contamination

- Preferential flow paths through the siltstone, or along the contact between that siltstone and the overlying sandstone, that can significantly alter groundwater flow and contaminant transport characteristics

- Variable contaminant migration rates for different constituents associated with natural attenuation processes and changing oxidation-reduction conditions in the aquifer moving away from the landfill perimeter

Attachment B Comment No. 4 (page 4-4). *As a result, 1,4-Dioxane would only be expected to migrate slowly to the southwest over a distance of, at most, a few hundred feet from the edge of the landfill.*

The apparent detection of 1,4-Dioxane in monitoring well OI-35A (at 39 ppb) in 1993 and 1994 may indicate migration along a preferential pathway to this area through a fracture in the Pico unit[6].

[6] ..... Migration along such a preferential pathway is not exhibited in other portions of the southwest area, indicating that the migration into the vicinity of well MW-35A represents a very limited pathway for migration of landfill constituents.

EPA's Response. It is not clear how the consistent detections of 1,4-dioxane at Well OI-35A, throughout the period of record (1992 to present), could represent an "apparent detection" as is indicated in this text. The consistent, repeated detections of this constituent in the 20 to 60 microgram per liter (ug/L) range at a distance of over 1,800 feet from the landfill perimeter represents a confirmed detection.

Migration along preferential pathways has been observed in portions of the Southwest Area outside of Well OI-35A. Well OI-34A, which contains several organic constituents from the landfill, is beyond the zone of groundwater migration that ENVIRON calculated and presented in Figure 3.4. In addition, inorganic constituents are present above MCLs at several wells in the Southwest Area (e.g., Wells OI-29A and OI-32A) that are also beyond ENVIRON's calculated migration zone.

Attachment B Comment No. 5 (page 4-5). *It is apparent from this Figure that few metals are migrating at concentrations above MCLs beyond a few hundred feet from the edge of the OII landfill.*

EPA's Response. Although the referenced figure was not provided in the Attachment, MCL exceedances of inorganic constituents have been observed in multiple sampling events in several wells in the Southwest Area outside the landfill boundary, including Wells OI-29A,

OI-32A, OI-33A, and OI-43A. These wells are located anywhere from about 350 to 800 feet downgradient of the landfill boundary.

Attachment B Comment No. 6 (page 4-7). *An analysis of the direction of groundwater flow in the vicinity of the North Parcel (see Figure 3.4) clearly indicates these wells are located in positions where groundwater could not have migrated from the refuse disposal areas to these locations*[7].

[7]*The direction of groundwater flow depicted in Figure 3.4 likely represents consistent direction of flow over the long term, as it is also consistent with the topography and direction of surface water flow in this same area*

EPA's Response. Wells OI-9A, OI-10A, and OI-10B are located in positions where contaminants from the OII Site could have migrated. The indication of a strong westerly flow direction (shown in Figure 3.4 of the comment) is projected from data from only one well, OI-44A. As evident in other parts of the site, flow direction can change considerably over a short distance (several hundred feet); and the groundwater contours in the northern area may not be that accurate given that there is a gap of over 2,200 feet without data (between Wells OI-44A and OI-10B). Further, based on geologic structure in the area, which dips towards the Potrero Syncline to the northwest, a northwesterly component of flow would not be unexpected.

Attachment B Comment No. 7 (page 4-7). *Second, nickel has only been detected at concentrations below the MCLs in monitoring wells such as OI-19A, OI-19B, CDD-13, or OI-13B/C, along the northern boundary of the South Parcel. Farther to the northwest, nickel has been detected in downgradient monitoring wells (e.g., OI-01A/C and OI-19B), but at concentrations even less than detected near the landfill and, again, below the MCL. Farther to the west, however, nickel has been detected at much higher concentrations (above the MCL) than have been detected nearer the landfill.*

EPA's Response. This comment misstates actual data. Nickel has exceeded the MCL in Wells CDD-13 and OI-13C on multiple occasions. The concentrations observed further to the west are not always higher than those detected nearer the landfill. In 1994, the nickel concentration at Well CDD-13, a well heavily impacted by landfill contaminants, was higher than all other wells in the Northwest Area except Well OI-46A.

Attachment B Comment No. 8 (page 4-9). *Within the eastern area, two monitoring wells (OI-20A and OI-30A) have exhibited detectable levels of TCE, cis-1,2-DCE, and vinyl chloride at relatively consistent levels since 1990 (although recent concentrations of TCE have declined to near the MCL of 5 µg/l).*

EPA's Response. Recent (1994 and 1995) concentrations of trichloroethylene (TCE) in Wells OI-20A (approximately 30 ug/L) and OI-30A (over 100 ug/L) have not declined to near the MCL. In fact, volatile organic compound concentrations in Well OI-30A had been consistently increasing through 1994.

Attachment B Comment No. 9 (page 4-9). *Until 1993 the concentration of TCE was lower than was detected farther west (upgradient) in well OI-20A, which indicates that the combined effects of dilution/dispersion and degradation are substantially reducing the concentrations of these constituents as they migrate to the east in the Unconfined Aquifer. In 1993 the concentration of PCE and TCE increased slightly to concentrations above the MCL, possibly in response to the historically large rainfall the prior winter.*

EPA's Response. There is no evidence to support the claim that the "combined effects of dilution/dispersion and degradation are substantially reducing the concentrations" of TCE, cis-1,2-dichloroethylene (DCE), and vinyl chloride. In fact, the higher volatile organic compound concentrations observed in downgradient Well OI-30A compared to perimeter Well OI-20A indicate that there is a source area along the northeastern perimeter of the South Parcel with much higher contaminant concentrations than those observed in Well OI-20A. The source of the elevated volatile organic compounds in Well OI-30A is a data gap that should be addressed during remedial design.

The consistently increasing volatile organic compound concentrations over a 2-year period make it difficult to envision how short-term high rainfall could be a factor at this downgradient well located several hundred feet from the landfill perimeter and screened more than 50 feet beneath the water table.

Attachment B Comment No. 10 (page 4-11). *Similarly, the degradation that is apparently occurring in the eastern area of the OII site makes it highly unlikely that any significant concentrations of chlorinated solvents or other organic compounds would ever reach water supply wells in the San Gabriel Valley Basin within the Whittier Narrows.*

EPA's Response. EPA agrees that it is extremely unlikely that organic constituents from the OII Site could reach water supply wells in the San Gabriel Basin, especially with a perimeter control system implemented. The increasing contaminant concentrations in the Eastern Area demonstrate that natural attenuation alone is not sufficient to meet performance standards without perimeter liquids control.

Attachment B Comment No. 11 (page 7-2). *The elevated concentrations of nickel detected above MCLs in the Unconfined Aquifer throughout the northwest area clearly relate to other off-site sources. In particular, the concentrations detected in the monitoring wells farthest downgradient and crossgradient from the OII site could not have originated from leachate at the OII landfill, and must be related to other, as yet unidentified, sources to the north and northeast of the North Parcel.*

EPA's Response. EPA continues to believe that the elevated concentrations of nickel in the Northwest Area are related to the OII Site. The highest concentrations of nickel observed at the landfill are in Wells OI-4 and OI-51P, which are heavily impacted by landfill contaminants.

Thus, there is direct evidence to support the presence of high levels of nickel impacting groundwater adjacent to the landfill. Although the presence of a landfill-related nickel source in the Northwest Area is not readily apparent from the current distribution of contamination, the northwest portion of the South Parcel (in the vicinity of Well CDD-13) that is the primary contaminant source area for the observed inorganic groundwater contamination in the Northwest Area is the oldest portion of the landfill. Thus, interior source conditions could have changed significantly over the last 30 years. Significant changes in the contaminant source can be expected as the landfill gets older. Further, as described in Section 7 of the Draft Remedial Investigation Report (EPA, 1994c), there is ample additional evidence (beyond elevated nickel) of landfill-related impacts at wells in the Northwest Area.

Responses to Oral Comments

In this section, EPA provides responses to selected oral comments received at the public meeting held on June 12, 1996. EPA responded to many of the comments during the meeting. Those comments not addressed during the meeting are responded to below. The full transcript of the public meeting is included as Appendix A of this ROD. Responses are provided in the sequence that the comments were received during the public meeting.

Oral Comment No. 1- Mr. Jeffers (page 15 of Appendix A). *Under a theory that a plume is moving from contamination, which wells would be in jeopardy based on the flow, the geological flow of water?*

EPA's Response. For a variety of reasons, EPA believes that there is very little chance of any production well in the San Gabriel or Central Basins being impacted by contamination from the OII Site, regardless of the alternative selected. Please see the response above to the De La Puente written summary comment for additional detail.

Oral Comment No. 2- Male Public Speaker (page 17 of Appendix A). *During a heavy rainfall, what is the danger of the water spreading so that it might contaminate wells that might be used?*

EPA's Response. The groundwater conditions in the vicinity of the OII Site are not significantly impacted by heavy rainfall. We do not observe significant changes in the velocity or direction of groundwater flow correlated with rainfall events that would cause significant additional spreading of the contamination.

Oral Comment No. 3- Ms. Turpin (page 20 of Appendix A). *We've been having slight seismic activity in the area, and there is usually a little bit of buckling and shifting, and of course over the years and months especially a lot of resettling of the land. How much have these plumes or leaks shifted and to where are they going? These drifts and leaks and plumes shifted, and where are they going?*

EPA's Response. EPA has not observed any changes in the areas where releases from the landfill have occurred or are occurring correlated with seismic activity. It is very unlikely that slight seismic activity could cause additional or new releases from the landfill. This is because earthquakes do not cause widespread cracking underground unless the area of concern is directly on the fault and near the epicenter of the quake.

Oral Comment No. 4- Mr. Brown (page 25 of Appendix A). *The question is: Under the center of the landfill itself, what is the situation with groundwater in the center of the landfill? I didn't see any drilling in that area, so we don't know how deep the landfill has contaminated under the center of the landfill and what levels of concentrations of various things, if there are no wells. So I'm wondering why didn't you drill wells, and if you did, they may not be shown there, or if somebody did in the past, what type of levels of contamination do we have in the center of this area geographically?*

EPA's Response. Although EPA has not installed any monitoring wells beneath the center of the landfill, we believe that the groundwater monitoring well network at the site is sufficient to evaluate the potential for deeper releases beneath the landfill. Given the hydrogeologic conditions at the site, groundwater flow is much more prevalent in a horizontal rather than a vertical direction. Thus, a release from the base of the landfill would likely migrate horizontally, towards the landfill perimeter. EPA has installed monitoring wells around the landfill perimeter that are completed in various geologic units up to several hundred feet beneath the waste prism. If a significant deep release occurred, it would be detected in these monitoring wells.

Oral Comment No. 5A- Ms. Chu (page 47 of Appendix A). *I see that in your schedule you're about to put the landfill cover on the dump, and I have some real concerns. It has been described to me as a big plastic cover.*

And I'm concerned because, of course, we in the City of Monterey Park have to look at that and there are thousands of people that are driving by that area. I would hope that you do some kind of landscaping and that you make it aesthetically pleasing because I have this image of a huge upside down Tupperware bowl. And I would hate to see all this money going into cleanup and for this to be the laughingstock of all of L.A. County. That's one comment.

EPA's Response. EPA is aware of the community's concerns regarding landfill cover aesthetics. The landfill cover design is being performed under a previous EPA ROD and is not part of this ROD. EPA is considering this comment during landfill cover design.

Oral Comment No. 5B- Ms. Chu (page 48 of Appendix A). *The other thing is that I, of course, would like to reiterate that we -- I hope that you take into consideration the economic issues here.*

We in the City of Monterey Park are very interested in making sure that the northern 45 acres is as economically viable as possible. And so even though I know you're not discussing the thermal dynamic destruction facility today, again I'd like to reiterate that I hope you take into consideration the -- our availability to build on that 45 acres and that you place the TDF in the southern parcel.

EPA's Response. EPA understands the City of Monterey Park's concerns regarding reuse of the North Parcel. This remedy does not preclude uses of the North Parcel that are compatible with protection of human health and the environment and proper operation of site systems. As with the landfill cover, the siting of the thermal destruction facility is part of the work on EPA's prior Gas Control and Cover ROD and is not a component of this ROD. EPA is considering this comment during siting of the thermal destruction facility.

Oral Comment No. 6- Mr. Alonzo (page 59 of Appendix A). *I agree with the previous speaker, I believe that the plan No. 3 is desirable for the simple sake of piece of mind. If you would draw this leachate at let's say three times the rate that it's being withdrawn today, this has to allow this dump to run dry much faster than the rate they are going right now. We spend many millions to develop the leachate plant, and it's only at about one-third the capacity from what I understand. So it's obvious that if you would draw more leachate, you could process the whole leachate problem that much faster. The question of putting a cover on this dump I think is the most important thing that we have facing us right now because presently you have some rainwater that percolates in which adds to the volume of your liquid; you have some gas that's escaping. If water can come in, gas is escaping. We're spending millions of dollars to do a thermal destruction facility. In the meantime, more gas is escaping through the roof than we're solving through this thermal destruction facility. It seems obvious to me that you should cap this thing, number one, and start withdrawing that liquid much faster than it's presently being done. $30 million is the difference between plan No. 2 and plan No. 3. But if you can terminate this problem 30 years faster, it's obvious that it's well worth the expense to accelerate this whole process.*

EPA's Response. EPA's response addresses three issues raised as part of this comment: cleanup times under Alternative No. 3, leachate treatment plant capacity, and landfill cover implementation.

Alternative No. 3 Cleanup Times. EPA's evaluations indicate that the interior extraction planned under Alternative No. 3, which would remove only 13 percent of the leachate in the landfill, would not result in accelerated cleanup of either the landfill itself or the contaminated groundwater. Please see the response to the written comment from RK Brown (on Page II-2 of this Responsiveness Summary) for additional discussion of Alternative No. 3.

Leachate Treatment Plant Capacity. Although the leachate treatment plant is currently running at below capacity, the plant capacity would be fully used with the implementation of the Gas Control and Cover ROD systems and the perimeter control system under this ROD. Additional

leachate extraction, such as that proposed under Alternative No. 3, would require expansion of the treatment plant beyond the footprint of the current plant.

Landfill Cover. EPA agrees that implementation of the landfill cover is an extremely important component of the landfill gas remedy. The landfill cover was previously selected as part of the Gas Control and Cover ROD, and design of the landfill cover is progressing concurrently with the thermal destruction facility siting evaluation.

Oral Comment No. 7- Dr. Wilkinson (page 61 of Appendix A). *.....unless the leachate program is very, very aggressive, which it doesn't sound like it is, why couldn't a few extra wells extracting directly from the dump be a good investment?*

EPA's Response. EPA does not believe that the potential additional benefits of interior leachate extraction under Alternative No. 3 warrant its considerable additional expense, as Alternative No. 3 would not present a significant improvement over Alternative No. 2 under the Superfund evaluation criteria. Please see the response to the written comment from RK Brown (on Page II-2 of this Responsiveness Summary) for discussion of the potential benefits of Alternative No. 3.

Oral Comment No. 8- Ms. Turpin (page 63 of Appendix A). *....everybody's running around like a chicken without a head about all these microorganisms that are coming up and it's supposed to be booga-boogas on mankind and whatnot. There's some that probably eat oil. Find something to eat the components of the leachate to dry it up and dispose of it properly. I mean, it's come down to that. We're not going to have too much time left geologically to really get rid of the stuff. Nobody's talking about denaturing anything. They've denatured everything else.*

EPA's Response. There is extensive biological activity occurring within the landfill. This activity is acting to decompose the solid waste and has significant impacts on the character of the leachate in the waste prism. Biological processes are used as a component of the leachate treatment system at the onsite treatment plant. However, EPA is not aware of any microorganisms that would be able to dry up the liquids inside the landfill.

Oral Comment No. 9- Mr. Taintongo (page 64 of Appendix A). *....Assuming that you do go with Alternative 3 with the extraction of the leachate on there, what impact would that have on accelerating cleanup of the site and bringing the south parcel back to productive use? Which is what I understand is the overall goal along with doing it in a clean and safe manner, but to basically bring these sites back to productive use.*

EPA's Response. As stated above in the response to Oral Comment No. 6, EPA's evaluations indicate that Alternative No. 3 would not accelerate cleanup of the South Parcel. The 13 percent of the overall volume of leachate targeted for removal in Alternative No. 3 would not impact the reuse of the South Parcel. This remedy does not preclude reuse of the South

Parcel consistent with protection of human health and the environment and proper operation of site systems.

Oral Comment No. 10A- Mr. Brown (page 66 of Appendix A). ....*We know a great amount of water occurs and has been shown to be moving through the Whittier fault. We see springs elsewhere in these hills that identify the movement of groundwater through the fault zone. I would expect that probably underneath this site there are splinters of the Whittier fault and would be major transporters of groundwater and maybe an entry point for the leachate getting into the groundwater.*

EPA's Response. As part of the remedial investigation at the OII Site, EPA performed extensive evaluation of the geology and hydrogeology in the OII Site vicinity, including evaluation of potential faulting. In addition, the OII Landfill Work Defendants have conducted a detailed seismic evaluation of the OII Site and vicinity as part of the landfill cover design. EPA does not believe that there are faults acting as "major transporters of groundwater" or "an entry point for the leachate getting into the groundwater" beneath the landfill.

Oral Comment No. 10B- Mr. Brown (page 67 of Appendix A). *Currently, if there are only two wells, as Hank has indicated, into the deep zones underneath the ground on the landfill prisms or so-called landfill fill area, we really don't have very much data as to how much liquid is present in this landfill.*

EPA's Response. As described in Appendix I "Landfill Structure" of the Feasibility Study Report (EPA, 1996), hundreds of data points, including deep and shallow wells and borings, provide information on the conditions inside the landfill. In Appendix F of the Feasibility Study Report, EPA used the data presented on the cross sections of the landfill in Appendix I to estimate the locations and quantity of liquids in the waste prism.

Oral Comment No. 10C- Mr. Brown (page 67 of Appendix A). *One of the key things that is normally done in evaluating water is to do a salt balance. It sounds like that nobody has done a salt balance on this landfill to determine how much salt, inorganic materials, are present at this landfill. This really relates to the question of whether you should extract the salts inside the landfill prism and how much you're going to extract at what rate. It sounds like you have a lot of assumptions and your recommendation is based upon assumptions that you've made about what is in this landfill. And I think really you need to find out area by area within this landfill to be able to document what the salts are that are present that would eventually approach this perimeter system that you're proposing. It's the balance of salts that are in this garbage added to the amount of leachate or flow of water from the surface or from an injection or whatever occurs, that's going to extract this material from the garbage body. But we need to know, for the confidence of the public, how many salts are there and at what rates we can expect the surface leakage and the other sources of water to free the salts to whether they should be either extracted at the garbage or extracted at the perimeter or extracted in the groundwater basin outside the boundary lines.*

EPA's Response. As described in Sections 6 and 7 of the Draft Remedial Investigation Report (EPA, 1994c), EPA has evaluated the inorganic quality (including common salts) of the landfill leachate and the surrounding groundwater. Section 7 of the Draft Remedial Investigation Report presents extensive evaluation of the inorganic character of the groundwater in the OII Site vicinity. These evaluations were used to interpret the nature and extent of landfill contaminant's impact on groundwater. EPA believes that the evaluations presented in the Draft Remedial Investigation Report are sufficient to assemble and evaluate alternatives to address landfill liquids and groundwater at the OII Site.

Oral Comment No. 10D- Mr. Brown (page 68 of Appendix A). *Frankly, it shocks me to hear that you are not going to immediately move to a rapid system to comply with the Clean Water Act. I thought the Clean Water Act was passed in Federal Government to achieve quick cleanup of groundwater pollution off-site of any responsible potential party to any citation. Clearly, the Superfund citation occurs here, and I think it would be paramount upon the federal managers of this site to move toward a quick remedy, not a remedy planning for 150 years. Very frankly, that shocks me, that under the Superfund law if we can agree upon and recommend a 150-year solution, we're clearly not moving toward rapid adherence to the Clean Water Act.*

EPA's Response. Considering the current and potential uses of the water resources and the technical difficulties in remediating this groundwater, EPA has concluded that the selected remedy (Alternative No. 2) complies with all ARARs, including the Clean Water Act. EPA believes that the selected remedy provides the best balance among the nine Superfund evaluation criteria. Cleanup times are incorporated into these evaluations.

Oral Comment No. 11- Mrs. Arenas (page 69 of Appendix A). *One of the reasons that I was asking about that area that you said that was contaminated the most is that I'm concerned about the integrity of that area....I agree this has to be taken care of aggressively because we don't have the time to let this water get contaminated. It takes years to get it cleared up, and you know that, too. And it's not going to affect us directly, it's not -- maybe not even my children. But I'm thinking of, in general, everybody that's going to be coming in contact with this water in the future. We can't just go with the Remedy 2, I would go with Remedy 3. You have to be more aggressive, especially around that area that you did say that's where all the liquid was deposited. There's no kind of cell that's going to keep that in there. Any earth movement, it's going to release that leachate back into the ground again. We had it coming up before. What's going to stop it once the earth starts moving?*

EPA's Response. EPA is confident that the perimeter control system to be installed under the selected remedy (Alternative No. 2), in conjunction with the landfill cover to be installed under EPA's prior ROD and the existing leachate control system, will be adequate to prevent future leachate seeps and other releases from the landfill. Monitoring will be performed to verify the

effectiveness of these systems. If the systems are not performing as expected, EPA will require appropriate measures to ensure that performance standards are met.

Oral Comment No. 12A- Mr. Jeffers (page 77 of Appendix A). *....Beyond that, I guess I'd also like to reiterate, I think you will hear tonight a desire for Option 3 be more thoroughly studied. One, we think that whether it affects the groundwater situation from the perimeter, I think it would put everybody's mind at ease. If you have the dump itself, in essence, clean dirt, the leachate removed from it quicker, although that may not be spreading out, I think it would be peace of mind plus the activity of productive use. I would love to talk to you about your definition of productive use as opposed to the community's definition of productive use later, but I think just from the residents, both Montebello and Monterey Park, I think the sooner we can say -- in essence, whether you're standing on the site, digging in the site, the sooner we can say it has a clean bill of health, we would all like to strive for that issue.*

EPA's Response. As stated above in the responses to Oral Comments No. 6 and No. 9, EPA's evaluations indicate that Alternative No. 3 would not accelerate overall cleanup of the South Parcel. It should be noted that even if all of the leachate could be removed from the landfill (which is not possible), the landfill would still contain hazardous and other wastes; and restrictions would still be required on the types of activities that could occur on the South Parcel. Please see the response to the written comment from RK Brown (on Page II-2 of this Responsiveness Summary) for additional discussion of Alternative No. 3.

Oral Comment No. 12B- Mr. Jeffers (page 78 of Appendix A). *Also, I would like to point out and highlight on to Councilmember Chu's comments on the cover. We really do have some concerns that this cover is going to really I think irritate both communities. I think if I was a resident and saw the "Tupperware" bowl that's being designed, and I looked out as I flipped my hamburgers every Saturday in my backyard, I would be really concerned about it. I know there's been pictures, computer-generated pictures, talking about landscaping, but I'm very leery after seeing many architectural drawings that depict one thing, but when we get the reality, it's totally different. And it may be down -- too far down the road before that is -- for us to come back and take a look at it. I think it really needs to be integrated into the community from the aesthetic level, and I haven't seen a lot of discussion or from the documents we've seen that we're really hitting that mark yet. I think there's still a long ways to go.*

EPA's Response. EPA is aware of the community's concerns regarding landfill cover aesthetics. The landfill cover design is being performed under EPA's previous Gas Control and Cover ROD and is not part of this ROD. EPA is considering this comment during design of the landfill cover.

Oral Comment No. 12C- Mr. Jeffers (page 79 of Appendix A). *The final thing is the SWEAP. We've been noticed from CURE that the original discussion of preparing and moving that to the Greenwood interchange has been scaled back drastically now. And we think that if work is going to be done in there for the gas ditch and this ditch for the leachate, the*

groundwater control, that it makes sense that the communities be served by going in there and preparing the eventual Greenwood Avenue for completion, which would service both communities at this time rather than doing it -- not doing it now and coming back whenever this property is -- 150 years from now, and having to do it then where costs would certainly exceed the expectation. It would make sense, it would be done jointly while they're doing the SWEAP.

EPA's Response. We understand the City's desires to incorporate the Greenwood Avenue extension into work along the western perimeter of the South Parcel. SWEAP is a component of work under the Gas Control and Cover ROD and is not included as part of this ROD. EPA is considering this comment during design of the SWEAP work.

Oral Comment No. 13A- Mr. Alonzo (listed as Male Public Speaker in the transcript (page 79 of Appendix A). *I think I would like to repeat what I had previously stated that I think that the sooner that we suck dry this dump, the more at ease people are going to feel about it. I mean, if we can dry up this dump 30 years sooner than the plans are with Plan No. 2, I think it's well worthwhile, as this gentleman over here mentioned earlier, that yes, it's a better solution, so it's obviously going to cost some more.*

EPA's Response. Alternative No. 3 could not remove all of the leachate in the landfill or otherwise "dry up" the landfill. Interior leachate extraction under Alternative No. 3 would only remove approximately 13 percent of the leachate in the landfill. EPA's evaluations indicate that this interior extraction would not result in an accelerated cleanup. Please see the response to the written comment from RK Brown (on Page II-2 of this Responsiveness Summary) for additional discussion of Alternative No. 3.

Oral Comment No. 13B- Mr. Alonzo (listed as Male Public Speaker in the transcript (page 80 of Appendix A). *But now this new development here that the capacity of the leachate plant may be overwhelmed if we suck out too much, that's a new thing that hadn't been explained to us previously. But I think that it might be useful for the staff that's involved with the dump to get a reading of what people in this audience feel. You have two choices, you have to go by No. 2, the plan that they think is preferable because it's cheaper, or the more aggressive plan to withdraw this leachate faster and spend more money and get it done quicker. I think that if we just had a straw poll of hands to see which way the audience feels, I think it might give them an idea which way we're all looking at.*

How many would think that item No. 2 is better than item No. 3? Let's see item No. 2 first. Just raise your hands if you think that item No. 2 is better than No. 3. -- (No response.)

How many feel No. 3 is the preferred way to go about it? -- (Show of hands.)

EPA's Response. EPA acknowledges that many community members voiced a preference for Alternative No. 3 at the community meeting. Prior responses in this Responsiveness Summary have clarified the apparent misconception that Alternative No. 3 would accelerate cleanup of

the South Parcel. Other community members and the State of California support Alternative No. 2, as noted in other comments in this Responsiveness Summary and in Part I (Section 7) of this ROD. Overall, EPA believes that Alternative No. 2 is the alternative that provides the best balance of the nine Superfund evaluation criteria. Please see the response to the RK Brown written comment (on Page II-2 of this Responsiveness Summary) for additional detail on EPA's evaluation of Alternative No. 3.

Oral Comment No. 14- Mr. Jeffers (page 85 of Appendix A). *....Again, I just want to reiterate, I think from our point of view, the Option 2 and 3, there may be no difference between groundwater movement of the plume and everything like that, but it's an issue of actually going into the landfill itself, cleaning it, and getting it done so that if there's a regional park or some sort of productive use, it can happen sooner. Again, that's why I take exception to your comment that there's no potential productive use ever for the south parcel. I think there is, but it has to be clean and it has to be able for us to do something with. But that has to be done. So I think that's the issue from our point of view by going in, extracting those chemicals and that element, it does allow for a use return and rather than just the groundwater aspect of it.*

EPA's Response. Please see the response to Oral Comment 12A, which covers the same basic issues as this comment. With regard to returning the South Parcel to "productive use," EPA would like to reiterate that because wastes will remain in the landfill, it will be a very long time, if ever, until the landfill will be "clean." Any future use will need to be compatible with ongoing environmental control systems and ensure protection of human health and the environment.

Oral Comment No. 15- Mr. Jeffers (page 86 of Appendix A). *....It just seems to make sense that the cost effectiveness over 50 or 150 years, the difference of $8 million present value of that is pennies over 150 years. And that's what we're talking about right now. But if we can return that to use or clear up the minds and ease of the Superfund, whatever community it is, I think it well worth those extra pennies.*

EPA's Response. The difference in cost between Alternatives No. 2 and No. 3 is approximately $31 million in net present value over the 30-year evaluation period. This represents a significant additional expenditure. EPA's evaluations indicate that the potential additional benefits associated with Alternative No. 3 are not significant, and do not justify the additional costs, considering the Superfund evaluation criteria. Alternative No. 2 provides equal protection of human health and the environment to Alternative No. 3.

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APPENDIX A

TRANSCRIPT OF PROCEEDINGS

PUBLIC MEETING ON THE PROPOSED PLAN FOR THE FINAL REMEDY

JUNE 12, 1996

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OPERATING INDUSTRIES, INC. (OII)
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PUBLIC MEETING ON THE)
PROPOSED PLAN FOR THE FINAL)
REMEDY)
)
)

TRANSCRIPT OF PROCEEDINGS

June 12, 1996

7:15 P.M.

Schurr High School
820 North Wilcox Avenue
Montebello, California

REPORTED BY:
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MONTEBELLO, CALIFORNIA; JUNE 12, 1996, 7:15 P.M.

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MS. ROSEN: Good evening. My name is Vicki Rosen, and I'm the Community Relations Coordinator at the OII site. I'd like to thank you all for coming tonight.

This meeting, as you know, is to discuss the Proposed Plan for the Final Remedy at OII. It's the last piece of the puzzle, the fourth operable unit that deals primarily with the groundwater around the site and the overall operation and maintenance of site facilities.

I'd like to introduce the other EPA people who are here with me tonight. First, Janet Whitlock, in the center of the room, she's our remedial project manager.

And Harrison Karr is in the back. He's from our office of regional counsel.

Arthur Haubenstock is also from our office of regional counsel.

John, where were you? He's outside. John's outside. And Murray's outside --

Murray. Murray's here. Murray Newton is visiting from our headquarters office in D.C. And John Blevins is the supervisor from Superfund who is

outside right now. He's here, too.

Okay. The purpose of tonight's meeting is to discuss the proposed plan, and not only the remedy that EPA prefers but also the various alternatives that we looked at, the criteria that we look at in evaluating them.

And we're going to go through this pretty briefly. We're going to summarize what you probably already read in this document and take your questions. If there are things about the document that you don't understand that Jan's explaining, please ask us. And then we'd also like to get your comments on any of the alternatives that have been discussed.

We have a court reporter here tonight. Hope is over on this side of the room, and she's going to be taking down your comments verbatim. Please keep that in mind when you speak. Speak up as best you can, state your name if you'd like and your comment or your question so that Hope can get it all down accurately.

We also have at the table when you walked in this comment form. You don't have to use this to submit a comment. You can. You can use another sheet of paper. You can take it with you and

mail it into Janet by July 3rd, or you can comment orally. You don't have to comment in writing. You can do both or one or the other.

Also, on the front table was this yellow fact sheet which is an update on another issue we've been interested in, the thermal destruction facility.

Basically what this says is that EPA has not made a decision on the siting of this facility yet, and it gives some of the reasons why we haven't made that decision yet.

This sheet will also be sent out to the entire mailing list later this week or early next week. So if you know people who aren't here tonight and are interested in this, they too will be getting this in the mail.

I think that just about covers it. Try and keep most of your questions and comments until after Jan's presentation. But please don't hesitate to speak up if she's talking about something that needs clarification. We want you to be able to understand the details here. Some of them are kind of complex. Please don't hesitate to speak up and ask questions.

Okay. Anything else? All right.

Thanks a lot.

MS. WHITLOCK: Okay. As Vicki told you, I'm Janet Whitlock. I'm the project --

Can you all hear me?

Is this better?

I'm the project manager managing the final remedy work for EPA.

We're going to have a slide show here so perhaps we should turn off the lights.

(Pause in the proceedings.)

MS. WHITLOCK: Can we have the lights for a minute?

Okay. As Vicki told you, this is the Public Meeting for the Proposed Plan of the Final Remedy at OII.

Next slide.

This is a photo of OII at the site. This is a photo taken from the air. It's called an aerial photograph. And I'd like to just reacquaint you with it.

This is the south parcel of the OII site. This is the north parcel. This is the Pomona Freeway which bisects the site. The city of Monterey Park is to the north of the Pomona Freeway. The city of Montebello is to the south of the Pomona Freeway.

Next slide.

The final remedy is for groundwater control and long-term operations and maintenance at the site.

I'd like to go through the slide show and describe the groundwater situation and the preferred alternatives or proposed plan for the final remedy. After the slides, I'd be happy to take your questions, answer them, and take your comments. I'm also very happy to answer your questions during the slide show. So please do feel free to stop me if you have questions.

Next slide.

First off, I'd like to give you a brief history of EPA actions at the site.

EPA was put in the position of running site systems when the owners walked off the site. In 1986 EPA began studying the site to determine the extent of environmental problems. As a result of the studies, site work was broken up into operable units.

This slide shows those operable units. The operable units are site control and monitoring, leachate management system, gas migration control and landfill cover, and the final remedy for groundwater and long-term operation and maintenance.

The agency has reached decisions on how to address the first three operable units. We're in the process of making the decision on the final remedy for groundwater and long-term operation and maintenance.

Next slide.

This slide shows the Superfund process for the final remedy. It shows the operable units up here, and the final remedy here. This is not clear. Is this a little better? I'm sorry. This is a little bit hard to read.

MS. ROSEN: It's duplicated in your proposed plan though.

MS. WHITLOCK: Again, we have site control and monitoring, operable unit No. 1; leachate management, leachate treatment plant, which is OU-2; landfill gas control and landfill cover, which is OU-3; and the final remedy for groundwater control and long-term operation and maintenance.

The Superfund process, this is remedial investigation. And in the remedial investigation, we investigate the problems at the site.

The next part of the process is the feasibility study. In the feasibility study, we assemble and evaluate the alternatives or solutions

to the problems.

We then enter into a public comment period where the public is able to comment on our alternatives and our preferred alternatives to address the environmental problem.

We then make a final decision and memorialize that decision for the remedy in a Record of Decision. We put that on paper.

We then go to take enforcement actions where we have the parties who dump at the site do the work for the final remedy.

We then move into detailed design and action or implementation of the remedy.

And then we go on to long-term operation and maintenance of the remedy.

Next slide.

We've completed the remedial investigation and feasibility study, and we're in the middle of the public comment period for the final remedy.

The remedial investigation report shown here emphasizes the evaluation of groundwater contamination at the site. This report is available in the local libraries.

Next slide.

The remedial investigation report also summarizes the extent of contamination from the landfill to air, soil, and surface water. It does not go into a detailed evaluation for these three media because EPA is already working on implementing a remedy for these media under the gas control and cover work.

Now I'd like to begin talking about the groundwater situation at the site. This slide shows a drilling rig that is installing a groundwater monitoring well.

Before I go into the details, I'd like to emphasize that no one is currently being exposed to contaminated groundwater from OII. We know that no one is drinking water contaminated from OII because no one is drinking water from wells in their backyard. Your water comes from local water distributors or purveyors who test their water regularly. You are not exposed to groundwater in your yards either. Groundwater is down beneath the ground far enough so you cannot dig deep enough to reach it.

To reach it for sampling and testing, we must drill into the ground and install wells as shown on this slide.

This is a slide of the closest groundwater production wells to the OII site. The distance between the lines, the circles, is about one mile. The distance from the center of the slide out one mile from those two lines is about a mile.

Our mission at EPA is to protect for future use of the groundwater as well as for current use. At OII, the groundwater remedy will be intended to protect any potential future use of the water and to protect any groundwater production wells away from the site from being -- from becoming contaminated from OII.

MR. CHRIS JEFFERS: One quick question.

MS. WHITLOCK: Yes.

MR. JEFFERS: Production wells or test wells, are they wells of private water companies?

MS. WHITLOCK: They are wells where groundwater is extracted for drinking water. They are wells for -- these wells up here I believe are for dewatering. There may be some other uses. So there's a wide variety of uses.

MR. JEFFERS: Your term "production well" is for testing and for use?

MS. WHITLOCK: Yes, primarily for use.

David, do you know on these wells what most of them are for?

MR. TOWELL: For municipal production wells producing groundwater.

MS. WHITLOCK: These ones aren't used for drinking, are they?

MR. TOWELL: No.

MS. WHITLOCK: Okay.

MALE PUBLIC SPEAKER: Could you indicate where the city of Monterey Park and the city of Montebello get their water from? Which wells are they and how far are they from the site?

MS. WHITLOCK: The -- I know the city of Montebello does not get all of its water from groundwater wells, I believe some of it comes from the Colorado River. Some of it probably comes from the groundwater wells --

David, do you know that one?

MR. TOWELL: The large areas of wells up to the northeast, that is the area where Monterey Park has production wells. And Montebello, the city of Montebello does have some production wells in the area to -- around the south of the landfills that Janet said most -- the majority of Montebello's water comes from imported water, surface water from either

the state water project or Colorado River.

MR. JEFFERS: So the city of Monterey Park's water is actually within two miles of the landfill?

MS. WHITLOCK: Yes.

MR. JEFFERS: Approximately under two miles?

MS. WHITLOCK: Yes, about two miles or so.

MALE PUBLIC SPEAKER: Is this slide depicting where the wells are in reference to the landfills so we can see the proximity?

MS. WHITLOCK: Excuse me, I can't hear you.

MALE PUBLIC SPEAKER: Is this slide just showing the proximity of the wells to the landfill for the sake of identifying where production wells are? Is that what this slide is to show?

MS. WHITLOCK: Yes.

MR. JEFFERS: Do you want to comment on the geological formations? Because water usually does not go uphill.

MS. WHITLOCK: Water does not go uphill. OII is at a groundwater divide and groundwater flows away from it locally in these

directions and maybe a little bit out this way (indicating). This water comes down like this, this way (indicating).

I think the regional water flow in general is going this way from the site.

David, correct me if that's not true. I don't know how -- out this way, exactly what it's doing.

I've been concentrating on the local areas right around the landfill because that's where we see the contamination. We don't see contamination very far out from the landfill.

MR. JEFFERS: When you say "not very far," about how far out?

MS. WHITLOCK: Our furthest monitoring well that's contaminated is around in here (indicating), less than half a mile.

MR. JEFFERS: So what percentage of wells, under a theory of a plume moving, which percentage of production wells would be affected in what area?

If you had to diagram it out like a piece of a pie, how could you take that on that chart?

MS. WHITLOCK: Which area, which

production wells are being -- I'm sorry, your question is which production wells are being contaminated from?

MR. JEFFERS: Under a theory that a plume is moving from contamination, which wells would be in jeopardy based on the flow, the geological flow of water?

MS. WHITLOCK: There are currently no wells, production wells, that are in jeopardy.

MR. JEFFERS: I understand that.

My question is: Under the theory that the plume was moving from contamination, which of those wells on this chart would be --

MS. WHITLOCK: Okay. The contamination heading out this way, we've got some contamination heading out this way and maybe that way, a little bit going out this way (indicating), so I would say probably these wells out here, potentially these wells. But that's nothing that we expect to happen. We don't expect that those wells --

MR. JEFFERS: I understand.

And I'm just using that for clarification because you put up a chart that shows a hundred wells in a circumference of a two-mile area, and one could depict that under the worst of worst

circumstances that all these wells might be in jeopardy. In fact less than 20 or 30 wells are -- under the worst circumstances would ever be impacted.

MS. WHITLOCK: My intention is to show you that the wells are a good distance away from the site.

MS. ROSEN: Could we have you identify yourself for the public record, please?

MR. JEFFERS: Chris Jeffers, city manager from Monterey Park.

MS. ROSEN: Thank you.

MS. WHITLOCK: Oh, Chris, I haven't met you. Nice to meet you.

MR. JEFFERS: Nice to meet you.

FEMALE PUBLIC SPEAKER: (Inaudible.)

MS. ROSEN: It would be minimal, very minimal, if it's noticed at all.

HEARING REPORTER: Excuse me, I can't hear you.

MS. ROSEN: Let me give you the microphone.

FEMALE PUBLIC SPEAKER: We did have a problem some years, maybe three years ago, where the top level of the dump would actually come down into the street and into the people's yards.

I was wondering, okay, you're talking at ground level -- groundwater level is very deep but the -- a great amount of rain, how much does it rise? Are you able to determine that?

MALE PUBLIC SPEAKER: There's very heavy rainfall --

MS. WHITLOCK: Let me address this question first and then we'll come to you. Is that okay?

MALE PUBLIC SPEAKER: Sure.

MS. WHITLOCK: It sounds like you're concerned about surface water. Okay. The surface water coming from the landfill is tested, and we don't see a lot of contamination in it. Okay? And it then goes into the -- it goes into the system into the drainage areas and into the sewers.

The groundwater in the wells, I don't believe we see any -- we don't see that really rise. The groundwater is really deep beneath the ground. It's at least 50 feet deep and in other areas a couple hundred feet deep. And so we aren't going to see too much impact from rain. Okay?

MALE PUBLIC SPEAKER: During a heavy rainfall, is there any danger of that -- I'm sorry.

During a heavy rainfall, what is the

danger of the water spreading so that it might contaminate wells that might be used?

MS. WHITLOCK: Again, we're getting into a surface water situation, and the surface water has very minimal contamination in it. And what -- the way that the groundwater is becoming contaminated is from leachate that leaves the landfill down underneath the ground and enters the groundwater system.

And so the groundwater isn't really becoming contaminated from surface water, it's from fluids, from liquids that were disposed of in the landfill leaving the bottom of the landfill -- not the bottom, but the sides of the landfill, and entering the groundwater system that way.

MS. ROSEN: Two different types of water.

MS. WHITLOCK: Two different, yeah, two different --

FEMALE PUBLIC SPEAKER: You're talking about minimal contamination of the surface water. Then why is it any time anybody who works in that area, they're always wearing protective gear?

Is that the air or is it just the possible minimal contamination actually moving around

and it's actually getting on their clothes? That is actually going down our streets and the children are walking on it and we're breathing it?

So why are you trying to minimize the contamination when any little bit of contamination is too much?

MS. WHITLOCK: You're right. Any contamination that is unsafe is too much.

The workers wear the protective gear when they are actually digging into the landfill or doing drilling, that sort of thing, and they are coming -- potentially coming into contact with subsurface contaminants that are a problem. We --

FEMALE PUBLIC SPEAKER: They're working and they are wearing protective clothing.

MS. WHITLOCK: Let's see. Is somebody from New Cure here right now able to address that?

Yes, Bud.

MR. BUD NEWMAN: Well, the men are instructed to wear protective equipment whenever there's any danger or possibility of contacting some contaminants. And it's just a safeguard. They may not ever touch any, but it's just to be sure.

MS. ROSEN: And isn't it part of your Site Safety Plan that they have to wear protective

clothing under certain conditions --

MR. NEWMAN: Yes.

MS. ROSEN: -- because they are exposed much more frequently to possible contaminants?

MR. NEWMAN: Yeah, there's certain levels at which they must wear different degrees of protective clothing. In most instances, they don't wear any.

MS. WHITLOCK: I was on-site today on the south parcel, and I did not have protective equipment on because I was not involved in digging with soil. And if I were involved and actually digging around, I would have that type of equipment on as a precaution.

Yes?

MS. GLORIA TURPIN: Excuse me. We've been having slight seismic activity in the area, and there is usually a little bit of buckling and shifting, and of course over the years and months especially a lot of resettling of the land.

How much have these plumes or leaks shifted and to where are they going? These drifts and leaks and plumes shifted, and where are they going?

MS. WHITLOCK: The groundwater

plumes --

MS. TURPIN: Leachate and --

MS. WHITLOCK: -- and leachate have not been impacted.

MS. ROSEN: Make a real distinction between the leachate and the groundwater because they are very different.

MS. WHITLOCK: Okay. The leachate -- Vicki just asked that I define leachate groundwater for you.

Leachate are the landfill liquids, the liquids that have been disposed of in the landfill that are actually within the --

MS. TURPIN: (Inaudible.)

MS. WHITLOCK: Okay. The landfill moves a little bit with earthquakes. We know that. We have seismic stations on the landfill that monitor for that. The landfill settles at a rate of a couple feet per year, so it does move.

We've been monitoring the groundwater, the contamination in the groundwater, and it has been for the most part -- now this is a broad generalization because the number of contaminants we see and the variability, but for the most part has stayed pretty much the same.

In the past five years since I've been looking at it, there hasn't -- we haven't really been able to see too much of a change.

MS. ROSEN: Jan, can I make a suggestion? I think when you go on with your presentation, some of these questions might be clarified to people in the audience.

So if we could just go on and maybe if you still have questions at the end, could we answer them at this time unless obviously more questions come up as she goes on with her slides.

MS. WHITLOCK: Okay. I'd like to backtrack a little bit.

Again, this slide, I'm showing it to show you where the closest production wells are at OII. These wells are not being impacted from contaminants at OII. The contamination is close to the landfill, and I'll get into that a little bit more in a minute.

Even though these production wells are not being impacted at this time, our mission at EPA is to protect for future use of the groundwater as well as for current use.

From this -- let's go on. Next slide.

This slide -- I'm sorry, this is hard

for you to see, again.

MS. ROSEN: What does it show?

MS. WHITLOCK: This slide shows OII. I'm going to use this pointer to show you the outline of it. This is the landfill, the south parcel; this is the north parcel.

You can kind of make out various dots in these areas around the landfill. These dots are the groundwater monitoring wells that have been installed by EPA to monitor the groundwater at the site.

Okay. Through our remedial investigation, we have found that contamination is heaviest around the perimeter of the landfill right in these areas that are very close to the landfill, particularly in the south corner here.

And as you move away from the landfill just out to these areas, the contamination drops off rapidly, and you see contaminants at about drinking water standards or levels that are allowed in your drinking water supply.

This is actually a fairly good situation, and it's due to the geological formation beneath the site. A large portion of the bedrock in this area is siltstone, which is a pretty tight

sedimentary formation that does not transmit liquid easily. And because of that, the contaminants have stayed pretty close to this border and have not moved very far.

Okay. Next slide.

There are many different types of contaminants in the groundwater due to the variety of materials placed in the landfill. These contaminants can be classified into two very broad types of contaminant: Organics and inorganic.

Just to give you an example of what these terms mean, I've listed a couple types of the chemicals up here. One type of organic chemical is vinyl chloride, dioxane, another type is benzene.

Two types of inorganic contaminants are mercury and nickel. Other inorganic contaminants are things like manganese and thallium.

And, again, I want to emphasize that we see the heaviest contamination very close to the landfill.

Okay. Our objectives for groundwater cleanup are listed on this slide. Once we finish the remedial investigation and we understood the extent of contamination at the site, we were able to proceed with the feasibility study to determine what to do

about the problem.

At the beginning of the feasibility study we determined objectives for groundwater cleanup. These objectives are listed on this slide. They are to prevent exposure to you from contaminated groundwater and to minimize the migration of contaminants from the landfill to groundwater.

Once we determined what the objectives were, we then assembled and evaluated various alternatives or options for cleanup of final remedy which includes the groundwater.

Next slide.

I'm going to go on and start talking about the various alternatives. Does anyone have any more questions about the groundwater situation? If you do, I can also show you some of the reports and diagrams at the end of the meeting. I've got the reports over here.

Yes?

HEARING REPORTER: Excuse me, I can't hear you.

MR. ROYALL BROWN: My name is Royall Brown.

The question is: Under the center of the landfill itself, what is the situation with

groundwater in the center of the landfill?

I didn't see any drilling in that area, so we don't know how deep the landfill has contaminated under the center of the landfill and what levels of concentrations of various things, if there are no wells.

So I'm wondering why didn't you drill wells, and if you did, they may not be shown there, or if somebody did in the past, what type of levels of contamination do we have in the center of this area geographically?

MS. WHITLOCK: I know we put in at least one well, if not two. I believe there is one well that was actually dry on the bottom. There are other areas of the bottom of the landfill that may come into contact with groundwater, we're not sure. I don't know if we have any actual samples.

Actually, Kent Flume (phonetic), you may know, did they test any? Did you do any samples when you guys went through the trash?

MR. KENT FLUME: (Inaudible.)

HEARING REPORTER: I can't hear you.

MS. WHITLOCK: No samples? Okay.

My main concern has not been what's happening underneath, but what's coming out the sides

and getting into the groundwater system from the sides. Because that -- the traveling, the water that's traveling out away from the landfill is the water that any user would potentially use if they were to put a well in their backyard, or that's the pathway that contamination would take if it were to get to one of the production wells.

Yes?

FEMALE PUBLIC SPEAKER: Is one of the reasons why the contamination is the most at that certain point where you're talking about, is one of the reasons why it is because of the way the landfill was built up?

Is it -- are you able to determine what kind of materials were put in that certain area or are you talking just gravity bringing everything down to that area -- gravity bringing down the contaminants to that area you said it was contaminated the most?

Can you determine -- are you -- do you have the information on what was put in certain areas of the landfill?

MS. WHITLOCK: There was a wide variety of material that was placed in the landfill pretty much all mixed up. The -- but, however, most of the

liquids were disposed of in that southern portion of the landfill --

Let's back up here and go to a slide again.

Okay. Most of the liquids in the landfill were disposed in this area. And that's probably why we see some of the worst contamination right around here (indicating).

FEMALE PUBLIC SPEAKER: (Inaudible.)

HEARING REPORTER: Excuse me.

MS. ROSEN: We can't hear over here.

FEMALE PUBLIC SPEAKER: Were liquids leaked into something to contain the liquid, or was it just thrown out and let seep into the ground?

Do you have that kind of information from the people that put this whole thing together to begin with?

MS. WHITLOCK: We know that the liquids were disposed along with the solid waste. And there was a certain amount of structure to the landfill where they did interim soil covers. And that may cause some of the liquids to be suspended in the landfill, so it's kind of layered here and there.

FEMALE PUBLIC SPEAKER: There wasn't any samples --

MS. ROSEN: Okay. The microphone --

HEARING REPORTER: I can't hear her.

MS. WHITLOCK: There was some, yes, but it was not well-planned like a modern day landfill.

FEMALE PUBLIC SPEAKER: What were the samples?

MS. WHITLOCK: What were they?

FEMALE PUBLIC SPEAKER: Where -- (Inaudible).

MS. ROSEN: Okay. We really need to get back to the presentation at this point and then we'll open up the floor to all these other questions.

Is that okay? Okay. Thank you very much.

MS. WHITLOCK: Something like this, it would probably help if I go straight to the document, and I can do that with you after the meeting.

MS. ROSEN: Right. Thanks.

MS. WHITLOCK: Okay. This slide lists various alternatives that we evaluated to solve the problems, the groundwater problems at the site.

No. 1, Alternative No. 1 is our No Further Action alternative.

Alternative No. 2 is Perimeter Liquids Control. This is our preferred alternative.

Alternative No. 3 is Perimeter Liquids Control Plus Source Control.

Alternative No. 4 is Perimeter Liquids Control Plus Groundwater Control.

Next slide.

This is a slide of our No Further Action alternative. This alternative allows for implementation of the landfill gas control and cover work and operations and maintenance of site systems. And it points out various site facilities in these boxes (indicating).

This alternative includes site security, facility maintenance, environmental monitoring, institutional controls to prevent use of contaminated groundwater, and leachate collection conveyance and treatment at the leachate treatment plant.

The other alternatives evaluated include the work in Alternative 1 in this alternative and add additional work for groundwater cleanup.

Next slide.

Although this alternative does not provide for groundwater cleanup, EPA is legally required to evaluate a no action alternative. This alternative satisfies that legal requirement.

Next slide.

This is a slide showing Alternative No. 2, and it is our preferred alternative. This includes the applicable components of Alternative 1 and adds perimeter liquids control to prevent the migration of contaminants from the landfill to the surrounding groundwater.

The perimeter liquids control would be instituted in this area. You can see some red in the slide there, also in this area as well.

This alternative allows natural attenuation of contaminants in groundwater away from the site. So contaminants and groundwater that are out in these areas would naturally attenuate over time.

Natural attenuation means that contaminants already present in the groundwater will clean up through dilution, retardation, and natural decay of the contaminants.

This alternative includes environmental monitoring of groundwater contamination to ensure that cleanup goals are met. So we would have a monitoring system to keep an eye on these contaminants out here.

This is our preferred alternative in

part because, again, the heaviest contamination is right around the perimeter of the landfill and contaminants are very low out in these areas, right around drinking water standards.

MS. ROSEN: Jan, would you also remind people that we're talking about contaminants that are very deep underground.

MS. WHITLOCK: Yes.

Again, to remind you, groundwater is not water that flows at the surface. This is water that is down deep enough in the ground so that we actually have to bring big rigs out, like that slide that I showed you before, and drill to it to get to it to monitor it and to sample it. So it's not water that you actually come into contact with.

Surface water is a different issue, and that is being dealt with under the landfill gas control and cover work. And I can answer your questions on that after the slide show if you have them.

Okay. Next slide.

This is a cross-section -- this might help some of you -- of our preferred remedy. This is slicing down vertically into the ground. This is the landfill. It shows a lot of siltstone in this area.

This shows the big span lens that is down deep.

The preferred alternative might include a shallow trench to capture liquids that are leaving the landfill in the shallow zone and extraction wells down deeper to extract contaminated groundwater.

I say "might" because this will be a performance-based remedy. And we expect that these technologies will be used, but it may be that, say, in the shallow zone, we may have wells instead of a trench. So there may be some variation on the technologies used.

This shows the groundwater monitoring well down in the deep zone. These are monitoring wells for landfill gas and groundwater. And so right on the other side of the extraction system we would expect to see monitoring wells to ensure that the remedy is effective.

This also shows the landfill cover that we're planning for the landfill in this area. And it shows that the water table -- we would expect that the water table may begin to drop over time and go down even lower than it is.

Next slide.

This is a slide of Alternative No. 4. This alternative -- Alternative No. 3, we'll back up.

Okay.

This alternative adds an interior extraction of leachate in the trash prism to all the components of Alternative 2.

So just like Alternative 2, we would have perimeter control in the areas that need it, and then we would add extraction wells in the landfill itself to extract liquids. And the intent here is to hopefully -- it would be to hopefully shut off the perimeter systems sooner than if we didn't have this alternative.

The evaluation and the feasibility study shows that this alternative does not speed up the cleanup time for the contaminated groundwater away from the site. So this alternative does not impact groundwater here in these areas. It just impacts the perimeter control system.

This alternative is the same as Alternative 2 in the way that it addresses that contaminated groundwater. We didn't choose this alternative because of the cost effectiveness of it. It is much more costly than Alternative 2 and does not improve the groundwater situation.

Okay. Next slide.

This is a slide of Alternative No. 4.

This slide includes perimeter control like Alternative No. 2. So we have perimeter control here. And this adds -- this alternative adds groundwater extraction away from the perimeter.

So we would have groundwater extraction happening in this area, potentially in this area, in these areas, around the perimeter, and out in this area (indicating).

This alternative would prevent contaminated groundwater from spreading further. It would speed cleanup time for some of the contaminants but not for others.

And this alternative would involve installation of wells out in the neighborhoods -- of piping to bring liquids back to the landfill, and installation of pumping stations out in the neighborhoods to bring that water back. So there would be a lot of construction involved out in the neighborhoods with this alternative.

Next slide.

This is a slide of the nine criteria. These alternatives, all four of them, were evaluated against the nine criteria. These criteria are required by law.

The first two criteria are the

threshold criteria, and any alternative that we pick must meet these two criteria. They are: Overall Protection of Human Health and the Environment and Compliance with Applicable or Relevant and Appropriate Requirements (ARARs). ARARs means that we look at state and federal laws that relate to this action.

All alternatives, Alternative Nos. 2, 3, and 4, all alternatives except the first alternative, are protective of human health and the environment and meet the ARARs. Alternative No. 1 does not comply with the applicable legal requirements.

The next five criteria on this list are the primary balancing criteria. These are the Long-Term Effectiveness; the Reduction of Toxicity, Mobility or Volume Through Treatment; Cost; Short-Term Effectiveness; and Implementability.

These are the technical criteria that the alternatives are evaluated against. The final two criteria, State Acceptance and Community Acceptance, are modifying criteria which would take into account before we make our final decision for the most appropriate alternative.

In the evaluation of the four

alternatives against the criteria, the biggest differences relate to compliance with ARARs and cost. This one, and this one (indicating).

Okay. I'd like to now discuss the evaluation against those two criteria, cost and ARARs, with you.

Let's go on to the next slide.

Okay. The aspect of the ARARs criteria with the most differences amongst the alternatives relates to the time to achieve chemical-specific ARARs for inorganic contaminants and groundwater.

This is hard to read, again, I'm sorry. Can you read that? That's this row right here (indicating), "Time Until Chemical-Specific ARAR is Achieved - Inorganics."

For Alternative 1, it would take a long time to clean up groundwater out away from the site to drinking water standards.

First, the leachate that is contaminating groundwater would have to stop leaving the landfill which will take a long time. And then the contamination in the groundwater would have to naturally attenuate on top of that.

Alternative No. 2 would take as -- potentially as long as 150 years in some areas to

reach ARARs. In other areas for other contaminants, such as organic contaminants, it would take a lot less time.

Alternative No. 3 would take the same amount of time as Alternative No. 2 to reach ARARs because Alternative No. 3 does not impact the contaminated groundwater away from the site.

The time to reach the chemical-specific ARARs for inorganics under Alternative No. 4 would be about 60 years in the worst areas.

Okay. Then we looked at cost. The cost of Alternative No. 1 over 30 years would be about $96 million. So the site -- this shows that the site is fairly costly to run.

Alternative No. 2 would cost about $115 million.

Alternative No. 3, which we didn't choose because it doesn't improve the groundwater situation, would cost 146 million.

And Alternative No. 4 would cost 164 million to 234 million depending on how aggressive we work in extracting the groundwater out away from the site.

Alternatives No. 2, 3, and 4 would take the same amount of time to reach those ARARs for

organic chemicals due to the natural decay of the processes. So these three alternatives take the same amount of time to get to the chemical-specific standards for organics. The difference between the inorganic chemicals, again that would be things like nickel, mercury, manganese, thallium.

Because no one is currently drinking the groundwater at or around the site, it's hard to justify that additional cost, that additional minimum -- additional $50 million when Alternative 2 protects the drinking water supplies and ensures that the groundwater will clean up.

What we have found is that we think Alternative 4 is not more effective at protecting public health under the current situation. But we do want to ensure that the groundwater does eventually clean up, and that would happen under Alternative No. 2.

Next slide.

MR. HERB WILLNER: Excuse me.

MS. WHITLOCK: Yes.

MR. WILLNER: Could I get -- I would like to get a question in here.

You're assuming that we're -- five, ten, fifteen, twenty years down the road we're still

not going to have any groundwater contamination.

But is there any way to open up the process in case we do? And then, what is the procedure for doing that if the worst does happen and our wells start to get contaminated?

MS. ROSEN: State your name please for the public record.

MR. WILLNER: My name is Herb Willner (phonetic), city of Monterey Park. I don't work for the city.

MS. WHITLOCK: We do want to monitor this situation to ensure the groundwater cleanup over time.

And there is a five-year review period that we go through once the remedy has been installed. And we would review the situation at that time and determine if there's a need to do anything differently. And it would be possible to amend the Record of Decision, if necessary, to be more aggressive in the groundwater cleanup. And there's always that opportunity if things turn out to be worse than we expect.

This Alternative No. 2, and all the alternatives as a matter of fact, include monitoring. So there -- we would regularly be sampling the

monitoring wells out away from the site and next to the site so we can watch the groundwater to see how the contamination is doing, to see whether it's behaving as we expect.

Next slide.

This is our Summary of Alternative 2, of the main components of it. Alternative No. 2 will control liquids at the landfill perimeter to prevent them from contaminating the groundwater. It provides for monitoring to ensure that the drinking water supplies are protected. It provides for the reduction of groundwater contaminant levels to drinking water standards. And it provides long-term operation and maintenance of all site systems.

Next slide.

This is a slide of OII from a helicopter, and this is the end of the slide portion of this public meeting.

I'd like to remind you, as Vicki told you earlier, that the public comment period ends on July 3rd, and if you have written comments that you'd like to mail in to me, please have them postmarked by July 3rd if you can.

And the documents, the Remedial Investigation and Feasibility Study reports are

available in your local libraries, at the Chet Holifield Library, the Bruggemeyer Memorial Library, and the Montebello Regional Library. I also have these documents on this back table.

And if you want to see -- if you want to know more about the geology or hydrogeology, I would be happy to show you some of the figures that we have in there.

Let's open up to questions.

MS. ROSEN: Questions and comments.

If you would like to comment about any of these alternatives, please once again keep in mind that Hope is over here trying to get everything down verbatim, so state your name and what your comments and/or questions are.

MR. MANUEL DE LA PUENTE: My name is Manuel de la Puente. I live in Monterey Park for 32 years, less than a mile from the landfill.

I read your proposed No. 2, the one you are proposing, and there's a statement that really bothers me: (Reading)

"Contaminated groundwater currently beyond the landfill perimeter would be allowed to rot away over time."

This is over how much time, 200 years?

500? 700?

MS. WHITLOCK: Okay.

MR. DE LA PUENTE: This is -- may I continue?

MS. WHITLOCK: What we expect --

MS. ROSEN: Are you finished, Manuel, or do you want to continue?

MR. DE LA PUENTE: No, no, I would like to continue.

MS. ROSEN: Go ahead.

MR. DE LA PUENTE: There's another statement. It's very reassuring for you to say that whatever you're going to do will be based in performance standards, therefore you are not giving a set of the steps you are taking, you are going to comply with a performance standard.

For instance, this water will be contained because the concentration will be contained at a certain level if I understand your statement correct.

You are complying with the standard; therefore, you are not committing to whatever it takes is what I read from your statement.

MS. WHITLOCK: Performance standards would be things like maximum contaminant levels for

drinking water --

MR. DE LA PUENTE: Uh-huh, yeah.

MS. WHITLOCK: -- and so we would be watching the groundwater to ensure that those maximum contaminant levels are in reach.

MR. DE LA PUENTE: Exactly. Or will not go up.

MS. WHITLOCK: Yes.

MR. DE LA PUENTE: The demonstration is a very optimistic assumption the level of contamination will go down. With 13 million gallons of toxic material in the landfill, I don't expect it to go down for the foreseeable future. That's my main statement.

Therefore, now, the question to you is: If this attenuation you are expecting in the groundwater doesn't occur --

MS. WHITLOCK: If what?

MR. DE LA PUENTE: If the attenuation, decrease in concentration, how far are you planning to go to contain the damage up to the level we are now? Are you going to be able to go to a step 3 or to Alternative 3, 4(a) or 4(b), whatever it takes?

Can you reassure us tonight that, yes, you will do whatever is required for the future

generations that this water will not continue?

MS. WHITLOCK: We can do whatever is required to protect health and the environment, and --

MR. DE LA PUENTE: We can do whatever is required to protect health and the environment, and that is what we intend to do.

We intend to prevent exposure to contaminated groundwater from the OII site, and if it ever looks like exposure would happen, we would change our plans and do whatever is necessary to stop that.

MS. ROSEN: Jan, can I add something to that?

MS. WHITLOCK: Yes.

MS. ROSEN: This is done all the time. We frequently alter a Record of Decision slightly when we find something new about a situation that would require us to look at it in a different way and respond differently.

So it is something that definitely could be done should we determine that it was necessary to protect human health and the environment.

MS. JUDY CHU: I am interested in

whatever would make the cleanup occur faster.

Oh, I'm Judy Chu (phonetic), and I'm on the Monterey Park City Council.

I see that you are saying that Alternative 3 would not make the cleanup go any faster, but why wouldn't it if you are also reducing the contamination at the source?

MS. WHITLOCK: Okay. The reason it wouldn't make the cleanup go faster is because we will be containing the contamination at the perimeter. We would be stopping leachate from entering the groundwater system at the perimeter.

If we did Alternative No. 3, if we went with that one and installed extraction wells in the trash prism, that wouldn't necessarily stop contaminants going into the groundwater any more quickly. Okay?

So it may make it so that maybe we could shut down this perimeter containment system sooner, but the perimeter containment system will have the same impact by stopping contaminants right around the border.

Does that help you understand? We can look at that cross-section again if that would be helpful.

MS. ROSEN: So in other words, putting those extraction wells on the landfill itself does not really add much value to the whole system, it doesn't really do that much in terms of changing whatever's going on around the perimeter of the landfill.

We still have to contain the groundwater at the perimeter whether we put in extraction wells on the landfill or not.

MS. WHITLOCK: It doesn't --

MS. ROSEN: We don't get enough benefit from the amount of money that it would require to put those in. You really don't see that much added value.

MS. WHITLOCK: It doesn't change what's happening out here (indicating).

MS. CHU: I also have another couple of comments.

I see that in your schedule you're about to put the landfill cover on the dump, and I have some real concerns. It has been described to me as a big plastic cover.

And I'm concerned because, of course, we in the city of Monterey Park have to look at that and there are thousands of people that are driving by

that area.

I would hope that you do some kind of landscaping and that you make it aesthetically pleasing because I have this image of a huge upside down Tupperware bowl. And I would hate to see all this money going into cleanup and for this to be the laughingstock of all of L.A. County. That's one comment.

The other thing is that I, of course, would like to reiterate that we -- I hope that you take into consideration the economic issues here.

We in the city of Monterey Park are very interested in making sure that the northern 45 acres is as economically viable as possible. And so even though I know you're not discussing the thermal dynamic destruction facility today, again I'd like to reiterate that I hope you take into consideration the -- our availability to build on that 45 acres and that you place the TDF in the southern parcel.

MS. ROSEN: Other comments?

Mrs. Arenas?

MRS. ARENAS: Okay. I just want to know whichever process you decide to use, what kind of disruption are the residents of nearby areas going to experience in terms of noise and in terms of dust?

Because some of us have pools, and we did have a lot of dust in our pools. It's going in some of them. The automatic cleaners are shot, our filters are shot. And what kind of disruption are we going to be experiencing during this process?

MS. WHITLOCK: Okay. Let me go over here to the map.

There will be some disruption to -- potentially some disruption to the residents that are very close right in this area, maybe a little bit out in here, and possibly a little ways further out from the landfill.

There would be wells that would be potentially installed in the neighborhoods. We've done this before, we've gone into the neighborhoods and we've installed groundwater monitoring wells. There could potentially be more of that.

There's going to be a trench that's going to be installed, and that would cause some disruption in this area.

If we were to pick Alternative 4, there would be a lot of disruption out in the neighborhood because there would be a lot of extraction work that would go in, a lot of piping going back to the landfill, and pump stations. We would have to find

locations for pump stations, so that would be a big problem.

As far as the landfill cover goes, which is also considered final remedy, there's going to be a lot of construction when that goes on, and we'll be taking every step we can to minimize the impact to you and to minimize any dust problems, odor problems.

Once we actually start doing this construction, if you are having problems, I would suggest that you call us and let us know because oftentimes there are things that we can do to resolve the problems for you.

For example, we've had people come up and complain about odors or call us up and complain about odors. Sometimes that means there's a crack on the soil that's on top of the landfill and we can repair that and stop the odor problem.

We don't live next to the landfill so we don't always know what you're experiencing. And when you are having problems, it's very important that you let us know.

And when we expect that you will have some disruption, we will let you know beforehand about that and about the general time frame that's

expected to occur.

MS. ROSEN: Dust especially is something that can be fairly easily controlled. And if you find that there's not enough water being applied to dirt that's being moved and it's creating a lot of dust, if you're not right near the people who are actually doing the work, please call me at my (800) number and we can make sure that water trucks operate more frequently and that keeps the dust down.

Identify yourself please.

MR. RON BERRY: Yes. My name is Ron Berry (phonetic) with the city of Monterey Park.

Back on the issue of Alternative 2 versus 3, I understand the concept of 2 and cutting off the seepage of the leachate out of the site, but if the -- if more wells were placed on the site itself, even though your trappings that leaves, wouldn't it have a long-range impact on the overall operating expenses? And I think the operating expenses for something that's going to go 50 years plus is going to be extremely, extremely high.

Also, one of the things that's mentioned in the Alternative 3 was that the leachate plant would have to be augmented.

Now, it's our understanding that the

leachate plant is running considerably under capacity now. And if so, why would it have to be augmented or how much would it have to be augmented?

And also there are some wells on the site in the trash prism right now, and I was just wondering, how many more would have to be placed in there to --

Because it shows a considerable cost difference in your valuation of 2 versus 3. I believe it's over $8 million. And I was curious as to where that was because the augmentation of the leachate plant, if it's under capacity now, why would that be a cost?

MS. WHITLOCK: Are you familiar with the specifics of those costs?

MALE PUBLIC SPEAKER: Yeah. I can . . .

MR. PHIL BURKE: My name is Phil Burke. I was involved in the feasibility study.

And to answer your first question on the costs, we did look at that and there's a capital cost for installing the wells. There's going to be more liquids and a higher concentration of liquids brought up through those wells. We had to modify the treatment plant. There's some capital cost there.

We also looked at the long-term O and M. By putting those wells in and pulling the liquid out, yes, you would get more liquid out and you would get it out sooner. But we felt that we couldn't guarantee that we get all the liquids out of the landfill and you would still have to keep that perimeter system running almost in perpetuity.

So the cost benefit really isn't there and you just have to keep that perimeter system going.

Does that answer your question?

MR. JEFFERS: Chris Jeffers. I guess --

MS. WHITLOCK: And you work with?

MR. JEFFERS: The city of Monterey Park.

I guess the statement is that there's going to be this ditch around the site till the end of time.

MR. BURKE: Containment system, yes.

MR. JEFFERS: So the 150 years means nothing. I mean until the end of time there's going to have to be this operation going in order to go with the extraction?. And do your costs reflect that?

MR. BURKE: The costs are based on 30

years. We've run a -- the operation and maintenance out 30 years for the containment system.

Eventually the landfill will run dry. It's really anybody's guess as to how long that's going to take. Now, the 150-year estimate, that's for some of the contaminants outside of the landfill to degrade to below MCLs. It's two different things there. One's groundwater, one's liquids within the landfill.

MS. ROSEN: Let me clarify that MCLs are drinking water standards, maximum contaminant levels.

MR. JEFFERS: To tag onto that question, if I may, is at what point in earth's history do the MCLs reach -- where do we reach clean water standards on this time chart?

MS. WHITLOCK: What we expect for inorganic -- for organic contaminants, I believe in this Alternative 2 we could reach them as soon as -- is it 12 years, Phil?

In this area, I believe it's about 43 years for organics? So it varies from area to area.

For inorganics in this area, we would expect to reach MCLs in about 150 years.

MALE PUBLIC SPEAKER: Okay. When

Alternative 3 -- realizing that you'll never get every drop out of this landfill, what does it do to those numbers?

I mean, the documents we have, it just alludes to that -- I guess you could draw the conclusion that may be a year or two sooner. But there's no definitive number here that we've been able to --

MS. WHITLOCK: It would be the same for these as for Alternative 2, again, because Alternative 3 doesn't impact the groundwater away from the site, it just impacts what is happening with the perimeter system.

And we're either going to -- if we were to extract the liquids and stop contaminants from leaving the landfill into the groundwater that way, you're solving the problem.

If you stop the contaminants from entering the groundwater at the perimeter, you're solving the problem with the groundwater.

So the time frame for cleanup of the groundwater is the same for Alternative 2 and 3.

MR. DE LA PUENTE: Can you clarify the basis --

MS. WHITLOCK: Can you wait for a

minute, Manuel? We have a question over here.

MRS. ARENAS: Just out of curiosity, there was some talk a few years ago regarding the EPA program, that it were going to be ceased, it was going to stop because of the funding.

Okay. Once this project starts, is that money going to be put aside? I mean, if there's no way it will stop because of lack of funding, it is put aside for this project and it can never be taken away again?

MS. ROSEN: That was Mrs. Arenas talking.

And, yes, there will always be funding for this because the funding is provided by consent decrees that have been reached with the Potentially Responsible Parties, and the funding is in place for these activities.

MS. WHITLOCK: So our next step is --

MS. ROSEN: Harrison, do you want to add to that?

MR. HARRISON: Yeah. Some of the funding is now in place in an escrow account for the final remedy but not all of it.

We do expect after the final Record of Decision is signed -- this is Harrison Karr from

EPA -- after the Record of Decision is signed, we expect to initiate negotiations with the companies that disposed of wastes in the landfill and the companies that operate in the landfill in an effort to have them perform or pay for the remainder of the cleanup.

There are some funds from prior settlements, including the settlement with the municipalities, which are set aside for final remedy, but it is not expected to be enough to pay for the entire work.

I don't think anybody can guarantee that those funds will always be there. But as long as the EPA is around and the Superfund Program is around, I think you can expect that we will be there to be sure that this work continues.

MS. ROSEN: Thank you.

Hank?

MR. HANK YOSHITAKE: Yeah, I need to talk to you -- Hank Yoshitake, city of Montebello -- first to kind of answer some of the questions that were brought up.

In regards to wells under the dump, there --

MS. ROSEN: Speak slow. Speak slowly,

Hank, so that Hope can get this down, please.

MR. YOSHITAKE: Okay.

At the hearing of the AQMD, the south quarter for the management district, there was testified that there's two wells under the dump that are both contaminated but nobody is using that water.

Secondly, I have to agree with Monterey Park -- it's not very often I agree with Monterey Park, but in this case I will because I think Alternative 3, if you look on their Reduction and Toxicity Mobility Volume, the difference between Alternative 2 and Alternative 3 is approximately 2-1/2 times more reduction in organic and inorganic material.

Some of the organic you got here is vinyl chloride, arsenic which is in leachate, and the faster we get it out of there, the better. And I think for the added expense -- yes, there's an added expense. What else is new? Now, if you want something better, it's going to cost more.

I would have to agree, and I will recommend Alternative 3 over 2 just for that, just to get it out of the ground earlier because we know what's up there to begin with.

I don't want to get into TDF.

MS. WHITLOCK: Hank, I would like to emphasize that the liquids that are in the landfill, if we stop them at the border of the landfill, they are not impacting human health and the environment.

MR. FRANCISCO ALONZO: I'm Francisco Alonzo (phonetic), councilmember from the city of Monterey Park.

I agree with the previous speaker, I believe that the plan No. 3 is desirable for the simple sake of piece of mind.

If you would draw this leachate at let's say three times the rate that it's being withdrawn today, this has to allow this dump to run dry much faster than the rate they are going right now.

We spend many millions to develop the leachate plant, and it's only at about one-third the capacity from what I understand. So it's obvious that if you would draw more leachate, you could process the whole leachate problem that much faster.

The question of putting a cover on this dump I think is the most important thing that we have facing us right now because presently you have some rainwater that percolates in which adds to the volume of your liquid; you have some gas that's escaping.

If water can come in, gas is escaping.

We're spending millions of dollars to do a thermal destruction facility. In the meantime, more gas is escaping through the roof than we're solving through this thermal destruction facility.

It seems obvious to me that you should cap this thing, number one, and start withdrawing that liquid much faster than it's presently being done.

$30 million is the difference between plan No. 2 and plan No. 3. But if you can terminate this problem 30 years faster, it's obvious that it's well worth the expense to accelerate this whole process.

MS. ROSEN: Thank you.

Who's next?

DR. WILKINSON: I am because I'm closest.

I'm Dr. Wilkinson, and I've been a family doctor for 40 years.

One question. The major aquifer is the San Gabriel River, the upper and lower basin.

Is there any monitoring for that? Because, I mean, many of the local water companies use that.

And then a comment. Our Beverly Hospital has been interested, we even have disaster drills based on problems with the dump.

We had a cluster of kidney cancer about three years ago and we asked the health department to investigate. And they said it was not abnormal, that it was a normal cluster.

But what I'm saying is is that we have a concern about that.

And for historical accuracy, isn't all of the dump in Monterey Park?

PUBLIC SPEAKER: Yes.

DR. WILKINSON: And that's a sore point. This is kind of mea culpa by Monterey Park. The former mayor of Monterey Park was raising the height limit of the dump over the objection of Montebello so that some of the problems that we're having with this dump are a direct result of that action. So --

And I tend to feel, too, unless the leachate program is very, very aggressive, which it doesn't sound like it is, why couldn't a few extra wells extracting directly from the dump be a good investment?

MS. ROSEN: Thank you.

MS. WHITLOCK: Okay. I'd like to maybe just address the groundwater portion of your comment.

We don't have -- San Gabriel Basin is out this way, and we don't have contamination from the landfill in the San Gabriel Basin. We have some monitoring wells in this area. Okay? And contamination has gone a short ways out, maybe this far. Okay?

The central basin is out this way. This is where the production wells are on that map I showed you.

In regard to leachate, we will be extracting a lot of liquids from the perimeter under Alternative 2, and the leachate treatment plant would be used to capacity.

And if there's more capacity that's needed, we can build that into the treatment plant.

MS. TURPIN: Excuse me for the simpleton rule, but basic chemistry teaches you that many things have a denaturing process, Tronjon 90 (phonetic), U2-38 (phonetic), et cetera, you know, hot stuff often becomes denatured, you know, gold into -- something else goes to iron and whatnot, why can't you find something to help denature the leachate, or most of its components, get it dried up

to cake, and then trek down and dispose of it properly?

The second thing is everybody's running around like a chicken without a head about all these microorganisms that are coming up and it's supposed to be booga-boogas on mankind and whatnot. There's some that probably eat oil. Find something to eat the components of the leachate to dry it up and dispose of it properly.

I mean, it's come down to that. We're not going to have too much time left geologically to really get rid of the stuff. Nobody's talking about denaturing anything. They've denatured everything else.

MS. ROSEN: Would you identify yourself, please.

GLORIA TURPIN: Gloria Turpin, former ecology student from Cal State L.A.

MS. ROSEN: Thank you.

This gentleman over here has had his hand up for a while, and then we'll go back to Hank.

MR. CALVIN TANATANGA: Thank you.

I'm Calvin Tanatanga (phonetic) with the city of Monterey Park.

I have two questions. One is: In your

Alternative 3, you talk about the extraction of the leachate. And I know under earlier rod (phonetic), it was specific with the extraction of leachate. So I'm curious to know how -- was this addressed, this kind of extraction addressed in that earlier rod? That's one question.

The other question I have: Assuming that you do go with Alternative 3 with the extraction of the leachate on there, what impact would that have on accelerating cleanup of the site and bringing the south parcel back to productive use? Which is what I understand is the overall goal along with doing it in a clean and safe manner, but to basically bring these sites back to productive use.

MS. WHITLOCK: Did you mean the north parcel on the productive use portion?

MR. CALVIN TANATANGA: The south parcel.

MS. WHITLOCK: The south parcel?

We'll start with the leachate. The leachate rod -- well, actually, let's back up a little bit. We wouldn't look at the leachate rod. That was mostly for the leachate treatment plant.

But under the site control and monitoring operable unit, there was a provision in

that operable unit to operate the existing leachate systems on the site. And that's because those systems are there and collecting leachate. And the intent was to keep that going and to keep those systems going.

The intent under Alternative 2 would be to stop leachate from entering groundwater and to put in an extraction system around the perimeter to keep the groundwater clean.

Personally, I don't envision that the south parcel will return to any sort of use. I suppose maybe there's a possibility, but I don't personally see it.

Okay. We had a hand up over here I think.

MR. BROWN: I'm Royall Brown, former director of the Upper San Gabriel Valley Municipal Water District. I'm going to have to correct you on your data and your definitions of the groundwater areas.

The upper basin is to the north. The natural boundary of the upper basin is considered the hills of which this landfill is a part of.

The river basin includes both the upper basin and the lower basin which is popularly known as

the central basin. They are all legally called the river basin, and they are all the San Gabriel River Basin. Therefore -- and the main part of the water that serves the central basin comes through Whittier Narrows, which is the natural outflow of the upper basin.

So the people who live in the southern area, when they get groundwater, they get a mixture of water coming from the upper basin and what is drainage and natural infiltration from their own neighborhoods. So those two sources combine together to be the groundwater supply for what we call the central basin. So this site, and it's surface water getting into the run-off system, does contribute to the groundwater on the south side.

So the questions has to do with what is this site contributing? And I want to raise a technical question because I didn't hear anything tonight about the fault zones.

We know a great amount of water occurs and has been shown to be moving through the Whittier fault. We see springs elsewhere in these hills that identifies the movement of groundwater through the fault zone. I would expect that probably underneath this site there are splinters of the Whittier fault

and would be major transporters of groundwater and maybe an entry point for the leachate getting into the groundwater.

Currently, if there's only two wells, as Hank has indicated, into the deep zones underneath the ground on the landfill prisms or so-called landfill fill area, we really don't have very much data as to how much liquid is present in this landfill.

One of the key things that is normally done in evaluating water is to do a salt balance. It sounds like that nobody has done a salt balance on this landfill to determine how much salt, inorganic materials, are present at this landfill. This really relates to the question of whether you should extract the salts inside the landfill prism and how much you're going to extract at what rate.

It sounds like you have a lot of assumptions and your recommendation is based upon assumptions that you've made about what is in this landfill. And I think really you need to find out area by area within this landfill to be able to document what the salts are that are present that would eventually approach this perimeter system that you're proposing.

It's the balance of salts that are in this garbage added to the amount of leachate or flow of water from the surface or from an injection or whatever occurs, that's going to extract this material from the garbage body.

But we need to know, for the confidence of the public, how much salts are there and at what rates we can expect the surface leakage and the other sources of water to free the salts to whether they should be either extracted at the garbage or extracted at the perimeter or extracted in the groundwater basin outside the boundary lines.

Frankly, it shocks me to hear that you are not going to immediately move to a rapid system to comply with the Clean Water Act. I thought the Clean Water Act was passed in Federal Government to achieve quick cleanup of groundwater pollution off-site of any responsible potential party to any citation.

Clearly, the Superfund citation occurs here, and I think it would be paramount upon the federal managers of this site to move toward a quick remedy, not a remedy planning for 150 years. Very frankly, that shocks me, that under the Superfund law if we can agree upon and recommend a 150-year

solution, we're clearly not moving toward rapid adherence to the Clean Water Act.

Thank you.

MS. ROSEN: Mrs. Arenas?

MRS. ARENAS: One of the reasons that I was asking about that area that you said that was contaminated the most is that I'm concerned about the integrity of that area.

In reference to the doctor, I've -- the way it seems that it wasn't put in properly, and I think you can agree with that. And I agree this has to be taken care of aggressively because we don't have the time to let this water get contaminated. It takes years to get it cleared up, and you know that, too. And it's not going to affect us directly, it's not -- maybe not even my children.

But I'm thinking of, in general, everybody that's going to be coming in contact with this water in the future. We can't just go with the Remedy 2, I would go with Remedy 3. You have to be more aggressive, especially around that area that you did say that's where all the liquid was deposited.

There's no kind of cell that's going to keep that in there. Any earth movement, it's going to release that leachate back into the ground again.

We had it coming up before. What's going to stop it once the earth starts moving?

MS. ROSEN: Any more comments?

MS. WHITLOCK: I would like to address that a little bit just to remind you that the contamination around the landfill just, you know, probably tens of feet away from the perimeter in some areas -- in most areas drops pretty close to drinking water standards.

We don't have a severe groundwater contamination problem here. There are many sites around the country that have far worse contamination problems. I think our worst problem at the site is our landfill gas problem. And I don't think the groundwater is the worst problem at this site. It does need to be addressed, and we need to put in that perimeter control system to address it, to stop the contamination from leaving the perimeter, but that is the worst area.

MR. YOSHITAKE: That's where she lives. But I have a question.

MS. ROSEN: Excuse me. Let's identify Hank Yoshitake here.

MR. YOSHITAKE: I'm Hank Yoshitake again.

Is there any leachate that is surfacing at the present time?

MS. WHITLOCK: No.

MR. YOSHITAKE: How about Iguala Park? This is where she has seen the workers with white jumpsuits working in that area. It's a fenced-in area by the way.

MS. WHITLOCK: Several years back during rainy seasons we had leachate seeps in Iguala Park, and we installed a trench in that area to intercept those seeps. We have not had any since and we do watch that area.

MR. YOSHITAKE: Let me make one quick comment to answer about a quick solution to drinking water. I think Janet's got it right, she's got bottled water.

(Laughter.)

MS. ROSEN: Chris Jeffers has a comment.

MR. JEFFERS: Chris Jeffers again. I've got some further clarifying issues.

You talk about the passive leachate plant, that would be where liquids would be directed towards, what is the current collection now -- let me back up.

What is the capacity of the leachate plant?

MS. ROSEN: Who knows the answer to that here? Bud?

Give him the microphone, please.

MR. NEWMAN: Bud Newman here.

The average rate that can be handled at the plant on a long-term basis is 24,000 gallons a day. We can handle short peaks of 31,500. And our current average is 8,600 gallons a day. But we do hit peaks up to about 13 or 14,000 during rainy seasons.

MR. JEFFERS: One of the things is, I guess under Option 2, you talk about adding, it looks like 7,000 more gallons a day average, if I read this right on --

MR. BURKE: No, higher.

MR. JEFFERS: What's the level?

MR. BURKE: Well, we would add by --

HEARING REPORTER: Excuse me. I can't hear you.

MR. BURKE: Alternative No. 2 adds about 130 gallons per minute. Now, not all of that water has to go through the full treatment plant

process. It's much less concentrated at the perimeter of the landfill and doesn't have to go through the full system. The Alternative No. 2 modifies that plant so that that less concentrated water can be run through there.

MR. JEFFERS: But my question is going to sort of deal with trying to get an understanding of what the capacity of the plant and how it could handle current Option -- Option 2, the preferred option in the Alternative 3 just so I understand.

But right now we're doing about 8500 now. That would be, without any calculations for this option, how much of that would be reduced when the final cover is placed on it? What percentage drop would you expect since you wouldn't have any outside moisture coming in, to percolate into it, to add to it?

MS. WHITLOCK: I don't know that figure off of the top of my head. I do know a lot of the liquids we've been collecting are groundwater. It's groundwater around the perimeter. And I don't expect that the cover would impact that volume.

MALE PUBIC SPEAKER: (Inaudible.)

MS. WHITLOCK: Oh, without Alternative 2?

MR. JEFFERS: Say the cover was on, would that 8500 be reduced to -- first, would it be reduced? Would it be reduced 10 percent? 15 percent? 20 percent? Whatever?

MR. TOWELL: This is David Towell, CH 2M HILL, we work with EPA Feasibility Study.

And we would anticipate that under Alternative 1, which is just the cover and the gas system, that the volume of liquids would not go down from its current rate. It would probably actually go up when the full system is implemented because there's additional liquids collected as part of the gas system.

So that anticipated drop in volume, we don't -- we wouldn't expect the cover immediately. Over many, many years is when you would start to see that.

MR. JEFFERS: Under Alternative 2, then, would your total collection rate exceed plant capacity?

MR. TOWELL: We would, in our evaluations in the feasibility study with the total collection rate, which is up around a couple hundred thousand gallons per day, we would be able to put through the existing plant with some piping and

pumping modifications. Because you're talking about a much lower -- less concentrated fluid than is currently put through the plant so that the overall size of the plant and of the treatment facilities at the plant would not change with Alternative 2.

MR. JEFFERS: With Alternative 3 what would the capacity need to be?

MR. TOWELL: With Alternative 3, which generates an estimated another 20 gallons per minute, which is -- essentially with Alternative 2 is part of Alternative 3. So that entire flow rate would need additional treatment processes which would approximately double the size of the treatment plant that is currently on-site.

MR. JEFFERS: So the treatment plant has to be able to handle 48,000 gallons a day?

MR. TOWELL: Plus the 200,000 from Alternative 2.

MR. JEFFERS: So under Alternative 2, the leachate treatment plant does have to be expanded to handle --

MR. TOWELL: The pumping and piping facilities, yes. The treatment components itself, we believe, would be able to handle that liquid. As I pointed out, it's a less concentrated fluid.

MR. JEFFERS: I guess --

MR. JOHN BLEVINS: Let me try to rephrase that to make it easier to understand. What we're saying is under Alternative 2 --

I'm John Blevins from EPA.

Under Alternative 2, the footprint of the existing plant would not change but we would have to do modifications to the plant itself in terms of pipes and pumps to handle the new groundwater flow.

The reason we can do that is because we're collecting liquid that's going to be very dilute in concentration of contaminants and we can make internal changes.

Under Alternative 3, because we would have interior groundwater extraction wells -- or leachate extraction wells, we would be extracting very concentrated leachate, we would have to expand the size of the treatment plant and make changes that would expand the footprint to the treatment plant to accept that waste.

The treatment plant under 3 would grow in size as well as the gallonage through the treatment plant would grow. That's the longhand way of trying to say all this.

MR. JEFFERS: So what studies have been

determined on the current sewer line capacity? Has that already been -- is that built to handle 200,000 gallons a day?

MS. WHITLOCK: Yes, it is.

MR. TOWELL: The feasibility study that Janet had referred to earlier does present our calculations of flow capacity for the sewer and for the treatment plant. So if you need additional details, I think you could have someone look through there.

MR. JEFFERS: I think we need it. I guess -- this is the first time I've heard that capacity is going to exceed the plant design under any option, and it's somewhat startling, plus we had some concerns about the sewer line. I don't think we were ever -- I can't remember being told that it was going to handle 200,000 gallons of liquid flowing through. That's the first -- it's news to me.

Beyond that, I guess I'd also like to reiterate, I think you will hear tonight a desire for Option 3 be more thoroughly studied. One, we think that whether it effects the groundwater situation from the perimeter, I think it would put everybody's mind at ease. If you have the dump itself, in essence, clean dirt, the leachate removed from it

quicker, although that may not be spreading out, I think it would be peace of mind plus the activity of productive use.

I would love to talk to you about your definition of productive use as opposed to the community's definition of productive use later, but I think just from the residents, both Montebello and Monterey Park, I think the sooner we can say -- in essence, whether you're standing on the site, digging in the site, the sooner we can say it has a clean bill of health, we would all like to strive for that issue.

Also, I would like to point out and highlight on to Councilmember Chu's comments on the cover. We really do have some concerns that this cover is going to really I think irritate both communities. I think if I was a resident and saw the "Tupperware" bowl that's being designed, and I looked out as I flipped my hamburgers every Saturday in my backyard, I would be really concerned about it.

I know there's been pictures, computer-generated pictures, talking about landscaping, but I'm very leery after seeing many architectural drawings that depict one thing, but when we get the reality, it's totally different. And

we may be down -- too far down the road before that is -- for us to come back and take a look at it.

I think it really needs to be integrated into the community from the aesthetic level, and I haven't seen a lot of discussion or from the documents we've seen that we're really hitting that mark yet. I think there's still a long ways to go.

The final thing is the SWEAP. We've been noticed from Cure that the original discussion of preparing and moving that to the Greenwood interchange has been scaled back drastically now.

And we think that if work is going to be done in there for the gas ditch and this ditch for the leachate, the groundwater control, that it makes sense that the communities be served by going in there and preparing the eventual Greenwood Avenue for completion, which would service both communities at this time rather than doing it -- not doing it now and coming back whenever this property is -- 150 years from now, and having to do it then where costs would certainly exceed the expectation. It would make sense, it would be done jointly while they're doing the SWEAP.

MALE PUBLIC SPEAKER: I think I would

like to repeat what I had previously stated that I think that the sooner that we suck dry this dump, the more at ease people are going to feel about it.

I mean, if we can dry up this dump 30 years sooner than the plans are with Plan No. 2, I think it's well worthwhile, as this gentleman over here mentioned earlier, that yes, it's a better solution, so it's obviously going to cost some more.

But now this new development here that the capacity of the leachate plant may be overwhelmed if we suck out too much, that's a new thing that hadn't been explained to us previously. But I think that it might be useful for the staff that's involved with the dump to get a reading of what people in this audience feel.

You have two choices, you have to go by No. 2, the plan that they think is preferable because it's cheaper, or the more aggressive plan to withdraw this leachate faster and spend more money and get it done quicker. I think that if we just had a straw poll of hands to see which way the audience feels, I think it might give them an idea which way we're all looking at.

How many would think that item No. 2 is better than item No. 3? Let's see item No. 2 first.

Just raise your hands if you think that item No. 2 is better than No. 3.

(No response.)

How many feel No. 3 is the preferred way to go about it?

(Show of hands.)

MALE PUBLIC SPEAKER: Thank you.

MR. YOSHITAKE: Hank Yoshitake again.

A lot of people think that the -- we're only talking about years of 10 years, 15 years. There's been approximately 300 million gallons of liquid waste dumped into that dump from these big tankers. So there's a lot of liquid down in the bottom that hasn't been touched yet. And I think we should understand that when we talk about extracting leachate as fast as we can, there's an awful lot down in there.

And I've heard that supervisors telling me that they're afraid to go down and test it to find out how much is there and they may have a rude awakening. And maybe that leachate plant that's there may have to be expanded tenfold. We don't know.

MS. WHITLOCK: For those of you who are interested, volume III of the feasibility study

report is a study of where we know liquids are in the landfill. And there are a lot of cross-sections in there that give you information on that.

Alternative No. 3 would not suck the landfill dry. It would be an attempt to find leachate in strategic places to help shut off the perimeter control system. It would be a big job to try and find all of the leachate in the landfill.

MS. ROSEN: Any more comments?

MS. PHYLLIS RABINS: (Indicating.)

MS. ROSEN: Phyllis?

Would you give her the microphone, please.

MS. RABINS: Can I make a comment about the destruction facility?

MS. ROSEN: Yes, ma'am. Identify yourself, please.

MS. RABINS: Phyllis Rabins, Monterey Park.

I'm concerned about the destruction facility being delayed. The most reprehensible part of this decision is that you will be exposing children from three schools near the dump to more toxic contaminated air. And that is unforgivable.

Monterey Park and Montebello are at

each other's throats because of the siting of this facility. I want to address the air because I think that's a big problem.

Tonight, I ask the EPA, the cities of Monterey Park and Montebello, and Cure Incorporated to get their act together and move to get this facility built and give it the highest priority.

I liked Dr. Wilkinson's remark about Monterey Park. No one here should ever feel sorry for Monterey Park. Monterey Park is responsible for this mess.

MS. ROSEN: Thank you.

MR. HARRISON KARR: Harrison Karr from EPA. I just thought I would respond to the comment about the aesthetics of the cover because --

MS. RABINS: Yes, I'm glad.

MR. KARR: -- a couple people brought that up.

The reason we didn't respond to that is that the remedial project managers from EPA that work on that part of that site are not with us tonight. But we're very aware that communities are very concerned about the aesthetics of the eventual landfill cover.

We will be discussing that with the

community. The PRPs are very aware of community concerns about that. We'll be working with them and with the communities to be sure that aesthetics are considered and that the community's concerns about aesthetics are taken into account.

MS. ROSEN: Thanks, Harrison.

Dr. Wilkinson.

DR. WILKINSON: One more historical note. When this controversy about raising the height of the dump came up, we were promised a regional park. And, again, I share this gentleman's idea that -- I'm not sure what you mean about "productive use," but I think at the bottom that those plans for the regional park were held out as perhaps a reason for raising the height of the dump. Again, mainly pushed by Monterey Park.

MS. WHITLOCK: I would also like to address the previous thoughts on Alternative No. 3.

Alternative No. 2 does not prevent us from going into the landfill and extracting leachate. That option would remain because we do have a performance based remedy. And if it appears that extracting leachate from the landfill will improve the groundwater situation, that can be done. And if we pick Alternative 2, it does not mean that that

will not happen.

MS. ROSEN: Does that do it for the questions and comments tonight?

MR. JEFFERS: Janet made this last comment, I guess -- you should have quit while you were ahead.

I'm Chris Jeffers.

Again, I just want to reiterate, I think from our point of view, the Option 2 and 3, there may be no difference between groundwater movement of the plume and everything like that, but it's an issue of actually going into the landfill itself, cleaning it, and getting it done so that if there's a regional park or some sort of productive use, it can happen sooner.

Again, that's why I take exception to your comment that there's no potential productive use ever for the south parcel. I think there is, but it has to be clean and it has to be able for us to do something with. But that has to be done.

So I think that's the issue from our point of view by going in, extracting those chemicals and that element, it does allow for a use return and rather than just the groundwater aspect of it.

MS. WHITLOCK: If that leachate is

contained in the landfill under the cover, do you think that it would hasten a return to beneficial use?

MR. JEFFERS: I don't know if I'm qualified to answer that. I mean that's something we would have to work with EPA and some, you know, expertise that would be able to tell us.

I mean, eventually we have to be able to settle the fears of users of that that there's not a hazard there, and certainly we want to be able to work through that.

Again, we're just getting parts of this and, unfortunately, this is the amount of the documentation that we have on this issue, and it's quite, I'm sure, a very technically involved issue that we're trying to sort through. But we would prefer --

It just seems to make sense that the cost effectiveness over 50 or 150 years, the difference of $8 million present value of that is pennies over 150 years. And that's what we're talking about right now. But if we can return that to use or clear up the minds and ease of the Superfund, whatever community it is, I think it's well worth those extra pennies.

MS. WHITLOCK: So you are very interested then in the beneficial issues of the south parcel.

MS. ROSEN: I would like to remind people that you can still send in comments. And if you have friends who could not make it here tonight and you think that they would like to comment on any of these alternatives, please have them get in touch with us.

You have until July 3rd to send it to Janet. Janet's name and address and all that information is on the proposed plan and on those comments sheets.

You have something to add, Harrison?

MR. KARR: Yeah, if I could.

I think one clarification, Mr. Jeffers, I believe that the numbers in the proposed plan are present value numbers.

Right?

The cost numbers in there are present value numbers, so they've already been brought back to present value.

There's just one other comment I wanted to make which is that a number of issues and questions and comments have been made tonight, we

haven't responded to all of them directly partially because some of the people that need to discuss some of these issues aren't here, partially because some of these things we really need to go back and look at and think about and respond to carefully and thoughtfully.

That's the job that's ahead of us now, to go back and look at all the comments we received during the public comment period. Some of them tonight and some of them in writing between now and July 3rd and think about them and analyze them and respond to them carefully in what's called a Response of the Summary. We have a big job ahead of us in doing that.

But to the extent that your comments -- that you feel tonight that your comments haven't been responded to carefully, they will be considered and responded to in Response to the Summary.

MS. ROSEN: Also, I would like to add onto that that some of the issues that were brought up that may not deal directly with the proposed plan and the groundwater issues, if you have questions, please call me and I will direct you to the right project manager who can answer your technical questions. Okay? And you've got my (800) number on

just about every flier you've received from us.

MS. WHITLOCK: And I will be available after the meeting over here by the reports which are again available at the local libraries. And if you want to see any specific information on the chemistry or the alternatives, I will be happy to help you look at those documents.

(The proceedings were concluded at 9:00 p.m.)

* * *

STATE OF CALIFORNIA)
) ss.
COUNTY OF LOS ANGELES)

I, Hope L. Mills Tucker, CSR 10095, a Certified Shorthand Reporter in and for the State of California, do hereby certify:

That the foregoing proceeding was taken down by me in shorthand at the time and place named therein and was thereafter reduced to typewriting under my supervision; that this transcript is a true record of the comments given by the public speakers and contains a full, true and correct record of the proceedings which took place at the time and place set forth in the caption hereto as shown by my original stenographic notes.

I further certify that I have no interest in the event of the action.

EXECUTED this 17th day of June, 1996.

Hope L. Mills Tucker

Hope L. Mills Tucker

APPENDIX B

"CANCER RISK ESTIMATES FOR VINYL CHLORIDE"

(EPA, 1992i)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

September 28, 1992

OFFICE OF
RESEARCH AND DEVELOPMENT

MEMORANDUM

SUBJECT: Cancer Risk Estimates for Vinyl Chloride

FROM: Jim Cogliano
Chief
Carcinogen Assessment Statistics & Epidemiology Branch
Office of Health and Environmental Assessment (RD-689)

TO: Arnold Den
Science Advisor
Region 9
San Francisco, California

In answer to your request, our current advice on assessing risks of partial lifetime exposure to vinyl chloride is best represented by my memorandum to you dated September 26, 1989, as updated by my memorandum to John Rauscher of Region 6 referencing the newer unit risk estimate.

Since the time of these memoranda, the scientific basis for this advice has been discussed in different scientific arenas.

(1) In February 1990 this information was part of a poster presentation, "Vinyl chloride: another look" (with J.C. Parker and W.E. Pepelko) at the 29th Annual Meeting of the Society of Toxicology. An abstract is published in *The Toxicologist*, Vol. 10, p. 349.

(2) In May 1990 the underlying bioassays and conclusions were discussed at the Risk Assessment Forum's Colloquium on Children as a Sensitive Subpopulation. Proceedings of the colloquium can be obtained from the Risk Assessment Forum.

(3) In November 1990 this information was presented as a poster, "Early life sensitivity to vinyl chloride-induced carcinogenesis," (with J.C. Parker and W.E. Pepelko) at the conference on "Similarities and Differences between Children and Adults: Implications for Risk Assessment," sponsored by the International Life Sciences Institute and by the Agency. A companion poster, "Experimental indications that early life may be a sensitive period of exposure for some chemical carcinogens," (with J.C. Parker and C.B. Hiremath) described preliminary indications of early-life sensitivity for some other chemicals, although the evidence is not as strong as for vinyl chloride.

(4) More recently, in November 1991 this material was included in a platform presentation, "Some implications of toxicology and pharmacokinetics for exposure assessment," (with J.C. Parker) at the conference on "Measuring, Understanding, and Predicting Exposures in the 21st Century." A companion paper has been peer reviewed and has been accepted for publication in the *Journal of Exposure Analysis and Environmental Epidemiology*, Suppl. 1, 1992.

(5) Currently, this information is being used as one of the focal points of a future Risk Assessment Forum Workshop on Sensitive Subpopulations, which is looking at Agency practices that enable risk assessments to quantitatively characterize sensitive subpopulations in a way that can be used in risk-based decisions, focusing on approaches that are ready for use. The workshop is being planned for early 1993.

I would like to thank you for stimulating discussion of the scientific evidence pertinent to early-life sensitivity to vinyl chloride and for your role in the appropriate implementation of this information in the Agency's risk assessment practices and risk reduction programs. If I can be of further assistance, please call me at 202 260-3814.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

25 SEP 1989
RA/DRA
Action Arnold
CC:
File
OFFICE OF
RESEARCH AND DEVELOPMENT

03 OCT 1989

SEP 26 1989

MEMORANDUM

SUBJECT: Status of Vinyl Chloride Assessment

FROM: James Cogliano, Ph.D.
Carcinogen Assessment Statistics & Epidemiology Branch
Office of Health and Environmental Assessment (RD-689)

TO: Arnold Den, Ph.D.
Senior Science Advisor
Region 9

THRU: Steven Bayard, Ph.D.
Acting Chief
Carcinogen Assessment Statistics & Epidemiology Branch
Office of Health and Environmental Assessment (RD-689)

Charles H. Ris
Deputy Director
Human Health Assessment Group
Office of Health and Environmental Assessment (RD-689)

As a followup to our telephone conversations, here is a status report and some preliminary results of my new assessment of the cancer risks from inhaling vinyl chloride. I request that this risk assessment information not be discussed in public until we can complete our evaluation.

The new assessment will include three separate analyses that give information on complementary aspects of the cancer risks from inhaling vinyl chloride. First, long-term exposure studies by Maltoni et al. (1981) will be used to give an estimate of the cancer risk from long-term inhalation of vinyl chloride. Second, a study by Drew et al. (1983) will be analyzed to show that this lifetime cancer risk is mostly attributable to exposures occurring early in the life of the animals. Third, studies by Maltoni et al. (1981) and Laib et al. (1985a, 1985b), which demonstrate that newborns are especially sensitive to the carcinogenic effects of vinyl chloride, will be used to quantify the cancer risks during the sensitive period. Details about each analysis are given below.

Conventional lifetime studies

Through the years, OHEA has published several estimates of the cancer risk for lifetime inhalation of vinyl chloride. The 1980 Ambient Water Quality Criteria and the 1984 Health Effects Assessment used total tumors from an early publication of the Maltoni et al. (1981) study, and the 1985 Health and Environmental Effects Profile used only liver hemangiosarcomas. All dose-response curves were based on administered inhalation concentration in rats.

Based on work by Gehring et al. (1981), it is now believed that metabolism follows Michaelis-Menten kinetics and that a linear dose-response relationship should be expected for because it is the metabolite thought to be carcinogenic metabolized dose, not administered dose. In addition, EPA's guidelines now call for adding risks from only significantly elevated tumor sites. Furthermore, both mice and hamsters (often thought of as a lung cancer-resistant species) incurred higher cancer incidence than the rats in the Maltoni et al. (1981) study.

Given the results this review of the earlier risk estimates, I am developing a new lifetime risk estimate that reflects this additional information. Because metabolized dose is a small fraction of administered dose at the high doses used in the animal studies, I anticipate that the new lifetime risk estimate will be higher than previous estimates. While the new risk estimate is being reviewed, I would suggest using the still-current estimate published in the Superfund Public Health Evaluation Manual, 0.025 per mg/kg-d. This is equivalent to a risk of 0.02 for exposure to 1 ppm vinyl chloride throughout adulthood. The discussion that follows shows how the available animal data can be modeled to elucidate the concern for partial lifetime age-dependent exposure.

Effects of age and duration of exposure on risk

In a study designed to compare the carcinogenic effects of partial lifetime exposures, Drew et al. (1983) showed that the effect of vinyl chloride depends on both age and duration of exposure. I have attempted to quantitatively describe this relationship without making mathematical assumptions that limit the applicability of the results. Assuming only that each dose carries a risk that is proportional to the amount metabolized and to some power of the remaining lifetime (so that exposures early in life would have greater effect), I found that Drew's data best fit the risk being proportional to the third power of remaining lifetime, although the data are also consistent with higher powers. Because the lifetime risk is higher for exposures early in life, my result is consistent with an earlier mathematical analysis by Brown and Hoel (1986), who showed that if the multistage model is suitable for describing the underlying

carcinogenic process, then Drew's data are consistent with a multistage model of 4 to 6 stages with a strong effect on the first stage and a lesser effect on a late stage.

Sensitivity of newborns

Newborn rats are sensitive to the carcinogenic effects of vinyl chloride. The Drew et al. (1983) and Maltoni et al. (1981) long-term exposure studies were not designed to detect this sensitivity, because animals were not initially exposed until 2 or 3 months of age. In contrast, Maltoni et al. (1981) also conducted an experiment in which newborn rats were exposed to vinyl chloride for only 5 weeks beginning at 1 day of age. His striking result is that a 5-week exposure at this critical period induces more hemangiosarcomas and hepatomas than does lifetime exposure beginning at 13 weeks of age. This result has been supported by evidence from two recent studies by Laib et al. (1985a, 1985b), who showed that "the induction of pre-neoplastic hepatocellular [foci] in rats by [vinyl chloride] is restricted to a well defined period ([approximately] day 7-21) in the early lifetime of the animals." They describe the dose-response relationship as linear down to the lowest dose tested (2.5 ppm for 40 hr/wk).

These studies of early-life exposure provide animal evidence to support the conventional wisdom that speculates about the young being more susceptible to certain cancer-causing agents. In the case of vinyl chloride, the animal data in rats is supportive of a public health concern for this young-age susceptibility. Conventional risk assessment approaches as used by EPA will not adequately describe the susceptibility associated with partial lifetime exposure at a young age. For example, it would not be appropriate to express exposure as a lifetime average computed by distributing a 5-week exposure over a full lifetime. Instead, an appropriate measure of exposure would be the average air concentration experienced throughout the sensitive period. Preliminary results indicate that the incremental cancer risk from breathing air with 1 ppm vinyl chloride throughout the sensitive period may be equal, and in addition to, the cancer risk from breathing the air with 1 ppm vinyl chloride throughout adulthood. At this time, it is not known whether the sensitive period in humans would be defined as a matter of weeks, matching the duration of the sensitive period in rats, or years, matching the fraction of the lifetime at which a comparable stage of development is attained.

Using the rat data (all tumors) of Maltoni et al. (1981) and Drew et al. (1983), together with assumptions regarding tumor development post-exposure and a conventional lifetime cancer risk estimate of 0.02 per ppm, the risk from 4-year constant exposures beginning at different ages can be summarized in the following table.

Estimated increased lifetime cancer risk to humans from 4-year exposures to 1 ppm vinyl chloride in air: differential effects of exposures starting at different ages

Age during 4-year exposure	Apportioned lifetime risk[1]	Age during 4-year exposure	Apportioned lifetime risk[1]
0-5[2]	$2x10^{-2}$[3]	38-41	$5x10^{-4}$
6-9	$5x10^{-3}$	42-45	$3x10^{-4}$
10-13	$4x10^{-3}$	46-49	$2x10^{-4}$
14-17	$3x10^{-3}$	50-53	$1x10^{-4}$
18-21	$2x10^{-3}$	54-57	$5x10^{-5}$
22-25	$2x10^{-3}$	58-61	$2x10^{-5}$
26-29	$1x10^{-3}$	62-65	$5x10^{-6}$
30-33	$1x10^{-3}$	66-69	$3x10^{-7}$
34-37	$8x10^{-4}$	Total 0-69	$4x10^{-2}$

[1]Per ppm, assuming lifetime risk is proportional to remaining lifetime after exposure to the 3rd power, and that equal fractions of a lifetime are equivalent across species.

[2]The 6-year period is adapted from the fraction of the lifetime (2 months out of 24) not covered by Drew et al. (1983).

[3]Based on Maltoni et al. (1981), in which the overall cancer risk from exposure immediately after birth was approximately equal to the overall cancer risk from chronic exposure later in life. This risk applies to <u>any exposure</u> occurring during <u>any portion</u> of this period.

Source: Analysis of Drew et al., 1983 and Maltoni et al., 1981.

This table shows that children face higher risks than adults for exposures of a given duration, if we accept the assumption that a rodent's age-dependent sensitivity to vinyl chloride can be, or should be, equated to humans. If one were to estimate risks from partial lifetime exposures by ignoring the age at exposure and considering only the number of years exposed (for example, by multiplying the full lifetime risk by 4/70 for a 4-year exposure), this would underestimate risks for children and adolescents and overestimate risks for adults over age 30.

Please note that we have proposed, at this time, to double the lifetime risk estimate for vinyl chloride, to account for the extra risk attributable to early lifetime exposures. I want to emphasize that this analysis technique is only deemed relevant to vinyl chloride and not, at this time, to other data bases, as we need to develop more experience and review of these concepts before recommending the far broader application.

A complete discussion of these results will be included in a report that I expect to have completed for review next month. In the meantime, I hope that you will find this status report to be informative. If you have further questions, please call me at FTS 382-2575.

References

Brown, K.G.; Hoel, D.G. (1986) Statistical modeling of animal bioassay data with variable dosing regimens: example--vinyl chloride. Risk Analysis 6(2):155-166.

Drew, R.T.; Boorman, G.A.; Haseman, J.K.; McConnell, E.E.; Busey, W.M.; Moore, J.A. (1983) The effect of age and exposure duration on cancer induction by a known carcinogen in rats, mice, and hamsters. Toxic. Appl. Pharmacol. 68:120-130.

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Maltoni, C.; Lefemine, G.; Ciliberti, A; Cotti, G.; Carretti, D. (1981) Carcinogenicity bioassays of vinyl chloride monomer: a model of risk assessment on an experimental basis. Environ. Health Perspect. 41:3-29.

cc: Hugh McKinnon (RD-689)
William Farland (RD-689)

VINYL CHLORIDE: Effect of Short-Term Exposures In Children

10/8/91

Based on:

Status of Vinyl Chloride (memo: J. Cogliano - A. Den, 26 Sept 89):

The above referenced memo sets forth risk estimates for short-term exposures to vinyl chloride in children based on a heightened susceptibility of neonatal animals demonstrated in studies by Drew et al. (Tox Appl Pharmacol 68:120, 1983 and Maltoni et al. (Environ Health Perspect 41:3, 1981). The risk table below has been updated from the 26 Sept 89 memo to incorporate a revision of the cancer potency factor for vinyl chloride (the original table in the memo was based on a CPF = 0.025 (mg/kg/d)^-1; the current CPF = 0.29 (mg/kg/d)^-1).

Estimated Excess Lifetime Cancer Risk to Humans From a 4 Year Exposure:

	Apportioned Lifetime Risk					
Age*	1 ppm	100 ppb	10 ppb	1 ppb	0.1 ppb	0.2 ppb
0 to 5	2.3E-1	2.3E-2	2.3E-3	2.3E-4	2.3E-5	4.6E-5
6 to 9	5.8E-2	5.8E-3	5.8E-4	5.8E-5	5.8E-6	1.2E-5
10 to 13	4.6E-2	4.6E-3	4.6E-4	4.6E-5	4.6E-6	9.3E-6
14 to 17	3.5E-2	3.5E-3	3.5E-4	3.5E-5	3.5E-6	7.0E-6
18 to 21	2.3E-2	2.3E-3	2.3E-4	2.3E-5	2.3E-6	4.6E-6

* Age range during 4 year exposure period.

APPENDIX C

CORRECTED TEXT, TABLES, AND FIGURES FROM THE FEASIBILITY STUDY REPORT (EPA, 1996)

INCLUDES:

PAGE 2-54

TABLE 3-1

PAGE B-224

PAGES B-228 to B-231

PAGE B-234

TABLE B5-1

TABLE B5-2

PAGE B.2-17

FIGURE B5-1

is supported by the fact that Records of Decision have been signed and Consent Decrees have been negotiated for the interim remedial actions selected for the first two operable units and the final remedial actions selected for the third operable unit (see Section 2.2).

2.6.2.2 Summary of Estimated Ambient Air Risks

Contaminant levels in air around the landfill were characterized by studies conducted as part of the remedial investigation: a 24-hour outdoor ambient air monitoring program conducted around the landfill perimeter from September 1989 to September 1990 (EPA, 1991c), and an in-home air sampling program performed from November 1992 through July 1993 in 197 homes to evaluate levels of vinyl chloride and methane (EPA, 1993a).

Results from the ambient air monitoring effort were evaluated to estimate potential health risks as part of the Baseline Risk Assessment. The ambient air monitoring station locations are shown in Figure 2-5. The in-home monitoring program was not designed for use in risk assessment, but was only intended to identify homes in need of interim gas control measures. Consequently, the in-home monitoring results were not used for the Baseline Risk Assessment evaluation.

Ambient air was found to present an elevated risk to human health at the monitoring stations around OII Landfill. Stations 1, 2, and 7 had the highest cancer risks, exceeding 3×10^{-4}, primarily due to the presence of vinyl chloride, a known landfill contaminant. Other stations had cancer risks falling in the 5.1×10^{-5} to 1.8×10^{-4} range. Excluding the influence of background pollutants, risks at Stations 1, 2, and 7 still exceed 1×10^{-4} under reasonable maximum exposure conditions and Stations 3, 4, and 6 exceed 1×10^{-5}.

Table 3-1
Preliminary Cleanup Goals
Oil Landfill Feasibility Study Report

	Air				Soil				Surface Water				Groundwater			
Contaminant of Concern	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units
ORGANICS	(Table C2-8)	(Table B6-1)				(Table B6-3)			(Table C2-4)				(Table C2-2)	(Table B6-2)		
1,1,1,2-Tetrachloroethane														0.68	0.68	ug/L
1,1,1-Trichloroethane		1,043	1,043	mg/m^3					200		200	ug/L	200	1,473	200	ug/L
1,1,2-Trichloroethane									5		5	ug/L	5	0.32	5	ug/L
1,1-Dichloroethane		521	521	mg/m^3		409	409	mg/kg	5		5	ug/L	5	1,000	5	ug/L
1,1-Dichloroethylene		0.05	0.05	mg/m^3					6		6	ug/L	6	0.07	6	ug/L
1,2,4-Trichlorobenzene									70		70	ug/L	70	23	70	ug/L
1,2-Dibromoethane		0.01	0.01	mg/m^3												
1,2-Dichlorobenzene						231	231	mg/kg	600		600	ug/L	600	464	600	ug/L
1,2-Dichloroethane		0.09	0.09	mg/m^3		1	1	mg/kg	0.5		0.5	ug/L	0.5	0.2	0.5	ug/L
1,2-Dichloroethylene (Total)						265	265	mg/kg						69	69	ug/L
1,2-Dichloroethylene, cis-						277	277	mg/kg	6		6	ug/L	6	77	6	ug/L
1,2-Dichloroethylene, trans-									10		10	ug/L	10	153	10	ug/L
1,2-Dichloropropane									5		5	ug/L	5	0.26	5.00	ug/L
1,3-Dichlorobenzene						284	284	mg/kg						2,599	2,599	ug/L
1,3-Dichloropropene, cis-									0.5		0.5	ug/L	0.5	0.13	0.5	ug/L
1,3-Dichloropropene, trans-									0.5		0.5	ug/L	0.5	0.13	0.50	ug/L
1,4-Chlorotoluene														600	600	ug/L
1,4-Dichlorobenzene						14	14	mg/kg	5		5	ug/L	5	0.72	5	ug/L
1,4-Dioxane														1.6	1.6	ug/L
2,4-Dimethylphenol														555	555	ug/L
2-Butanone						32,655	32,655	mg/kg						2,464	2,464	ug/L
2-Hexanone																
2-Methylnapthalene																
2-Methylphenol														1,745	1,745	ug/L
3,3'-Dichlorobenzidine						2	2	mg/kg								
4,4'-DDD														0.2	0.2	ug/L
4,4'-DDE														0.15	0.15	ug/L
4,4'-DDT														0.11	0.11	ug/L
4-Methyl-2-pentanone						18,249	18,249	mg/kg						198	198	ug/L
4-Methylphenol						353	353	mg/kg						174	174	ug/L
4-Nitroaniline																
Acenaphthene						36	36	mg/kg						423	423	ug/L
Acetone						14,416	14,416	mg/kg						768	768	ug/L
Aldrin														0.0005	0.0005	ug/L
Anthracene						2	2	mg/kg						2,028	2,028	ug/L
Benzene		0.29	0.29	mg/m^3		3	3	mg/kg	1		1	ug/L	1	0.58	1	ug/L
Benzo(a)anthracene						1	1	mg/kg								
Benzo(a)pyrene						0.1	0.1	mg/kg								
Benzo(b)fluoranthene						1	1	mg/kg								
Benzo(g,h,i)perylene																
Benzo(k)fluoroanthene						12	12	mg/kg								

Table 3-1
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OII Landfill Feasibility Study Report

	Air				Soil				Surface Water				Groundwater			
Contaminant of Concern	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units
Benzoic acid						282,579	282,579	mg/kg						142,999	142,999	ug/L
Benzyl alcohol														10,872	10,872	ug/L
Benzyl chloride														0.10	0.10	ug/L
BHC, alpha-														0.01	0.01	ug/L
BHC, beta-														0.05	0.05	ug/L
BHC, delta-																
BHC, gamma- (Lindane)									0.2		0.2	ug/L	0.2	0.06	0.2	ug/L
bis(2-Ethylhexyl)phthalate						61	61	mg/kg	4		4	ug/L	4	5.6	4	ug/L
Butylbenzylphthalate						14,129	14,129	mg/kg	100		100	ug/L	100	6,034	100	ug/L
Carbazole						43	43	mg/kg						3.5	3.5	ug/L
Carbon disulfide						53	53	mg/kg						27	27	ug/L
Carbon tetrachloride		0.16	0.16	mg/m^3					0.5		0.5	ug/L	0.5	0.25	0.5	ug/L
Chlordane									0.1		0.1	ug/L	0.1	0.06	0.1	ug/L
Chlorobenzene		20.9	20.9	mg/m^3		314	314	mg/kg	70		70	ug/L	70	51	70	ug/L
Chloroethane														27,808	27,808	ug/L
Chloroform		0.11	0.11	mg/m^3					100		100	ug/L	100	0.27	100	ug/L
Chloromethane														2.3	2.3	ug/L
Chrysene						2	2	mg/kg								
Di-n-butylphthalate						7,064	7,064	mg/kg						3,334	3,334	ug/L
Di-n-octylphthalate						7,300	7,300	mg/kg						9.3	9.3	ug/L
Dibenzofuran						1,460	1,460	mg/kg						112	112	ug/L
Dibromochloromethane									100		100	ug/L	100	1.0	100	ug/L
Dichlorodifluoromethane														516	516	ug/L
Dieldrin														0.01	0.01	ug/L
Diethylphthalate														28,803	28,803	ug/L
Dimethylphthalate														363,329	363,329	ug/L
Endosulfan														1.8	1.8	ug/L
Endrin									2		2	ug/L	2	10	2	ug/L
Ethylbenzene		1,043	1,043	mg/m^3		310	310	mg/kg	700		700	ug/L	700	704	700	ug/L
Fluoranthene						14,600	14,600	mg/kg						717	717	ug/L
Fluorene														253	253	ug/L
Heptachlor									0.01		0.01	ug/L	0.01	0.02	0.01	ug/L
Heptachlor epoxide									0.01		0.01	ug/L	0.01	0.01	0.01	ug/L
Hexachlorobutadiene						141	141	mg/kg								
Indeno(1,2,3-cd)pyrene						11	11	mg/kg								
Isophorone														89	89	ug/L
Methoxychlor									40		40	ug/L	40	162	40	ug/L
Methylene chloride		5.2	5.2	mg/m^3		1	1	mg/kg	5		5	ug/L	5	6.2	5	ug/L
N-Nitrosodiphenylamine						20	20	mg/kg						3.6	3.6	ug/L
Naphthalene						80	80	mg/kg						295	295	ug/L
Pentachlorophenol						2,119	2,119	mg/kg	1		1	ug/L	1		1	ug/L
Phenanthrene						7	7	mg/kg								

Table 3-1
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Oil Landfill Feasibility Study Report

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Contaminant of Concern	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units
Phenol						42,387	42,387	mg/kg						21,396	21,396	ug/L
Pyrene						2,119	2,119	mg/kg						566	566	ug/L
Styrene						220	220	mg/kg	100		100	ug/L	100	0.01	100	ug/L
Tetrachloroethylene		4.3	4.3	mg/m^3					5		5	ug/L	5	0.74	5	ug/L
Toluene		417	417	mg/m^3		275	275	mg/kg	150		150	ug/L	150	683	150	ug/L
Trichloroethylene		1.4	1.4	mg/m^3		221	221	mg/kg	5		5	ug/L	5	2.1	5	ug/L
Trichlorofluoromethane									150		150	ug/L	150	1,641	150	ug/L
Vinyl acetate						13	13	mg/kg								
Vinyl chloride	26	0.03	0.03	mg/m^3		1	1	mg/kg	0.5		0.5	ug/L	0.5	0.03	0.5	ug/L
Xylenes, m-						99	99	mg/kg						1,885	1,885	ug/L
Xylenes, o-														1,885	1,885	ug/L
Xylenes, p-						99	99	mg/kg								
Xylenes, total						99	99	mg/kg	1,750		1,750	ug/L	1,750	1,885	1,750	ug/L
INORGANICS																
Aluminum						77,385	77,385	mg/kg	1,000		1,000	ug/L	1,000	36,500	1,000	ug/L
Ammonia												ug/L		35,405	35,405	ug/L
Antimony						31	31	mg/kg	6		6	ug/L	6	15	6	ug/L
Arsenic						1	1	mg/kg	50		50	ug/L	50	0.05	50	ug/L
Barium						5,417	5,417	mg/kg	1,000		1,000	ug/L	1,000	2,555	1,000	ug/L
Beryllium						0.4	0.4	mg/kg	4		4	ug/L	4	0.02	4	ug/L
Cadmium - food						77	77	mg/kg								ug/L
Cadmium - water									5		5	ug/L	5	18	5	ug/L
Chromium VI						387	387	mg/kg	50		50	ug/L	50	183	50	ug/L
Chromium III						77,385	77,385	mg/kg	50		50	ug/L	50	36,500	50	ug/L
Cobalt																
Copper						2,863	2,863	mg/kg	1,300		1,300	ug/L	1,300	1,351	1,300	ug/L
Cyanide						1,548	1,548	mg/kg	200		200	ug/L	200	730	200	ug/L
Fluoride									1,400		1,400	ug/L	1,400	2,190	1,400	ug/L
Iron												ug/L				ug/L
Lead	1.5		1.5	mg/m^3					15		15	ug/L	15		15	ug/L
Manganese - food						10,834	10,834	mg/kg				ug/L				ug/L
Manganese - water												ug/L		183	183	ug/L
Mercury						23	23	mg/kg	2		2	ug/L	2	11	2	ug/L
Nickel						1,548	1,548	mg/kg	100		100	ug/L	100	730	100	ug/L
Nitrate (As NO3)									10,000		10,000	ug/L	10,000	58,400	10,000	ug/L
Nitrite (as N)									1,000		1,000	ug/L	1,000	3,650	1,000	ug/L
Selenium						387	387	mg/kg	50		50	ug/L	50	183	50	ug/L
Silver						387	387	mg/kg				ug/L		183	183	ug/L
Sulfate	25		25	mg/m^3												
Thallium									2		2	ug/L	2			ug/L
Tin						46,431	46,431	mg/kg								

Table 3-1
Preliminary Cleanup Goals
OII Landfill Feasibility Study Report

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Contaminant of Concern	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units	Chemical-Specific ARAR	Risk-Based Concentration	Preliminary Cleanup Goal	Units
Vanadium						542	542	mg/kg						256	256	ug/L
Zinc						23,216	23,216	mg/kg						10,950	10,950	ug/L
POLLUTANTS																
Carbon monoxide	10		10	mg/m^3												
Hydrogen sulfide	42		42	mg/m^3												
Nitrogen dioxide	470		470	mg/m^3												
Ozone	180		180	mg/m^3												
Sulfur dioxide	1.3		1.3	mg/m^3												
Suspended particulate matter	50		50	mg/m^3												

had estimated cancer risks that exceeded $3x10^{-4}$ under reasonable maximum exposure conditions for both adult and child exposures. Stations 1, 2, and 7 are located in the southwestern tip of the South Parcel near where vinyl chloride has been historically detected in landfill gas, leachate, and groundwater (EPA, 1994c). In addition to these three stations, cancer risks for Stations 3, 4, and 6, and background Station 8 all exceeded $1x10^{-4}$ under adult reasonable maximum conditions. Figure B5-1 presents the location of the nine ambient air monitoring stations and their associated estimated cancer risk values under reasonable maximum exposure conditions.

Under average adult exposure conditions, the estimated cancer risks at Stations 1, 2, and 7 were above $2.8x10^{-5}$. Average adult cancer risk at all other stations, including the background stations, was between approximately $1x10^{-5}$ and $2x10^{-5}$. The lowest estimated cancer risk was found at background Station 9.

Noncancer. At all air monitoring stations, hazard index estimates were below unity, under adult reasonable maximum or average exposure conditions, but exceeded unity for child reasonable maximum conditions (Table B5-2). As described in Section B3, the calculated hazard indexes between adult average and reasonable maximum exposure conditions do not differ. Figure B5-2 presents the adult reasonable maximum hazard index calculated for each ambient air monitoring station. Hazard indexes (the sum of the hazard quotients for each chemical) were approximately the same for all stations. The highest estimated hazard index was found at Station 4 (0.67), and the background Station 8 (0.62) was the next highest. The lowest hazard index (0.58) was estimated for both Stations 3 and 7.

B5.2.1.2 Risk Drivers

Chemicals contributing the most to an estimated cancer risk or hazard index are referred to as risk drivers. Individual chemicals driving estimated risks for ambient air were identified and are discussed below. Table B5-1 lists the chemical contribution (in percent) to the total cancer risk or hazard index for each station under reasonable maximum exposure conditions.

Cancer Risk Drivers. Vinyl chloride was found to be the greatest contributor to increased lifetime cancer risk at Stations 1, 2, 3, 4, 6, 7, and 8 (from 54 percent to 93 percent of the total estimated cancer risk) (Table B5-1). Vinyl chloride has been detected in the landfill gas, leachate, and groundwater in the area where these monitoring stations were located (EPA, 1994c). Vinyl chloride was not detected at Station 5 or background Station 9.

The primary risk driver at Station 5 and background Station 9 was benzene, contributing about 75 percent of the total risk. Elevated concentrations of benzene causing higher risks could be attributed to sources other than the landfill; for example, benzene in the ambient air is potentially associated with atmospheric pollution particularly from the highway (EPA, 1991c). No other chemicals contributed greater than 10 percent to the cancer risk at a nonbackground station.

Hazard Index Drivers. Carbon tetrachloride was the highest contributor to the hazard index at all stations (Table B5-1). The percent contribution of carbon tetrachloride to the total hazard index at each station ranged from 56 percent (at Stations 4 and 8) to 61 percent (at Station 9). Carbon tetrachloride was detected with high frequency but was qualified in the majority of samples collected, indicating that the chemical is present but at very low levels that are difficult to quantify. (The contribution of J-qualified data is discussed further in the following subsection.)

Tetrachloroethylene was the second highest contributor to the hazard index at every air sampling station, ranging from 19 percent (at Station 9) to 22 percent (at Station 8). Toluene was the only other chemical contributing greater than 10 percent to the hazard index at a station (Stations 4, 5, and 8).

Background Comparison. The 24-hour ambient air sampling report (EPA, 1991c) identified six chemicals at specified stations as being, at least in part, potentially from sources other than the landfill (e.g., auto exhaust emissions or emissions from oil production activities) or being at background levels:

- Benzene at Stations 1, 2, 3, 4, 6, and 7
- Toluene at Stations 1, 2, 3, and 7
- Tetrachloroethylene at Stations 2 and 7
- Chlorobenzene at Station 4
- Chloroform at Stations 1, 2, 3, and 7
- Trichloroethylene at Station 1

In view of the potential for offsite sources to influence the risk estimates for the nonbackground stations, it is important to account for background when interpreting the risk estimates for the nonbackground stations. A comparison of the results from the nonbackground stations with those for the background stations indicates that the total cancer risks for Stations 1, 2, 3, 4, 6, and 7 exceed background (at Station 8). The incremental increase in risk at each monitoring station for the adult reasonable maximum exposure case is summarized in Table B5-3. The results indicate that the incremental increase in cancer risk over background risks exceeds $1x10^{-4}$ at Stations 1, 2, and 7, and exceeds $1x10^{-5}$ at Stations 3, 4, and 6. Virtually all of the incremental increase in risk can be attributed to the presence of vinyl chloride at these stations.

Table B5-3 Incremental Increase in Excess Cancer Risk Over Background for Inhalation Residential Adult Reasonable Maximum Exposure Scenario OII Landfill Feasibility Study Report		
Station ID	**Total Excess Cancer Risk**	**Incremental Cancer Risk Over Background[a]**
Sample Stations		
1	5.86E-04	4.53E-04
2	5.46E-04	4.13E-04
3	1.79E-04	4.60E-05
4	1.78E-04	4.50E-05
5	5.10E-05	Background
6	1.43E-04	1.00E-05
7	3.14E-04	1.81E-04
Background Stations		
8	1.33E-04	---
9	3.57E-05	---

[a] Calculated as Station risk minus risk at Station 8.

B5.2.1.3 California Toxicity Factors

EPA toxicity factors used in this Baseline Risk Assessment differ from those of CalEPA. The differences in the toxicity factors are discussed in Section B4. Potential differences to the estimated cancer risks from using California toxicity factors were qualitatively evaluated.

Three chemicals of potential concern for air had state toxicity factors that were two or more times greater than the EPA toxicity factors (Table B4-5):

- Benzene levels were not elevated over background contamination at any of the sampling stations.

- Carbon tetrachloride contributed a risk of approximately $4x10^{-6}$ at all stations. Using the state slope factor (2.9 times higher) would increase the total risk at each station by approximately $1x10^{-5}$.

  Tetrachloroethylene contributed a cancer risk of about $1x10^{-6}$ at each station. Using the California toxicity factor, which is 25 times higher than the EPA value, it would contribute an additional cancer risk of $2.5x10^{-5}$ to the total station risk estimate. This additional risk would not result in Station 5 exceeding a total cancer risk of $1x10^{-4}$. Adult reasonable maximum exposure risks for all other nonbackground stations exceed $1x10^{-4}$ using either EPA or California toxicity factors. There is uncertainty associated with the California inhalation toxicity factor because it was route-to-route extrapolation from the oral EPA toxicity value.

Two chemicals of potential concern for air had state toxicity factors that were two or more times lower than the EPA toxicity factors:

- 1,2-Dibromoethane, only detected at background Station 9, did not contribute to cancer risk from air.

- Chloroform was only a risk contributor at Station 5; use of the California toxicity factor would slightly minimize this contribution.

B5.2.1.4 Summary of Ambient Air Estimated Risks

Ambient air was found to present an elevated risk to human health at the monitoring stations around OII Landfill. Stations 1, 2, and 7 had the highest cancer risks, exceeding $3x10^{-4}$, primarily due to the presence of vinyl chloride, a known landfill contaminant (Table B5-2). Other stations had cancer risks falling in the $5.1x10^{-5}$ to $1.8x10^{-4}$ range. Excluding the influence of background pollutants, risks at Stations 1, 2, and 7 still exceed $1x10^{-4}$ under reasonable maximum exposure conditions and Stations 3, 4, and 6 exceed 1×10^{-5}.

B5.2.2 Groundwater Well-Specific Evaluation

Groundwater sample results from January 1989 through October 1993 were used to calculate groundwater exposure risks on a well-specific basis. Adult residential receptors were evaluated for potential groundwater exposure via ingestion, volatile inhalation, and dermal contact. Risks were calculated using the reasonable maximum exposure conditions and average exposure point concentrations detected at each of the 72 groundwater monitoring wells at the landfill. As described in Section 2, exposure point concentrations were calculated two ways: using only those chemicals of potential concern for the individual well or using those chemicals detected in the well group. Both average and reasonable maximum exposure conditions were evaluated for each. These variations and other factors are intended to provide a sensitivity analysis to support risk management decisions. The results of risk calculations discussed below focus on chemicals detected in individual wells rather than in well groups. The sensitivity analysis is also summarized below, along with other factors affecting the risk estimates. Estimated risks from groundwater presented here are based on evaluations of current conditions. Under the modified no-action approach used in this Baseline Risk Assessment, the control systems

Table B5-1
Ambient Air Risk Calculations (Inhalation of Volatiles)
Adult Resident Reasonable Maximum Exposure Scenario
Oil Landfill Feasibility Study Report

Station ID	Chemical Name	Units	95%ile UCL	Calculated Units	Calculated value	Inhalation RFD[a] mg/kg-day	Inhalation SF[b] kg-day/mg	Intake - noncancer	Intake - cancer	Hazard Index	Cancer Risk	Percent of HI for Station	Percent of Risk for Station
1	1,1,1-Trichloroethane	ug/m3	17.49	MG/M3	0.0175	0.2857		0.0048	0.00205	0.017		2.78	
1	1,1-Dichloroethane	ug/m3	1.15	MG/M3	0.0011	0.14285		0.0003	0.00013	0.002		0.36	
1	Benzene	ug/m3	8.18	MG/M3	0.0082		0.02905	0.0022	0.00096		2.79E-05		4.76
1	Carbon tetrachloride	ug/m3	0.74	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00009	0.358	4.59E-06	59.27	0.78
1	Chlorobenzene	ug/m3	0.28	MG/M3	0.0003	0.005714		0.0001	0.00003	0.013		2.23	
1	Chloroform	ug/m3	0.55	MG/M3	0.0005	0.01	0.0805	0.0001	0.00006	0.015	5.16E-06	2.48	0.88
1	Ethylbenzene	ug/m3	4.81	MG/M3	0.0048	0.2857		0.0013	0.00057	0.005		0.76	
1	Tetrachloroethylene	ug/m3	4.40	MG/M3	0.0044	0.01	0.002	0.0012	0.00052	0.121	1.03E-06	19.96	0.18
1	Toluene	ug/m3	21.46	MG/M3	0.0215	0.11428		0.0059	0.00252	0.051		8.52	
1	Trichloroethylene	ug/m3	0.48	MG/M3	0.0005	0.006	0.00595	0.0001	0.00006	0.022	3.37E-07	3.65	0.06
1	Vinyl chloride (c)	ug/m3	3.29	MG/M3	0.0033						5.47E-04		93.34
2	1,1,1-Trichloroethane	ug/m3	16.80	MG/M3	0.0168	0.2857		0.0046	0.00197	0.016		2.74	
2	1,1-Dichloroethane	ug/m3	1.14	MG/M3	0.0011	0.14285		0.0003	0.00013	0.002		0.37	
2	1,2-Dichloroethane	ug/m3	0.46	MG/M3	0.0005		0.091	0.0001	0.00005		4.92E-06		0.90
2	Benzene	ug/m3	8.01	MG/M3	0.0080		0.02905	0.0022	0.00094		2.73E-05		5.01
2	Carbon tetrachloride	ug/m3	0.71	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00008	0.342	4.39E-06	58.18	0.80
2	Chlorobenzene	ug/m3	0.23	MG/M3	0.0002	0.005714		0.0001	0.00003	0.011		1.91	
2	Chloroform	ug/m3	0.65	MG/M3	0.0007	0.01	0.0805	0.0002	0.00008	0.018	6.19E-06	3.05	1.13
2	Ethylbenzene	ug/m3	4.75	MG/M3	0.0048	0.2857		0.0013	0.00056	0.005		0.77	
2	Tetrachloroethylene	ug/m3	4.20	MG/M3	0.0042	0.01	0.002	0.0012	0.00049	0.115	9.87E-07	19.57	0.18
2	Toluene	ug/m3	20.81	MG/M3	0.0208	0.11428		0.0057	0.00244	0.050		8.48	
2	Trichloroethylene	ug/m3	0.63	MG/M3	0.0006	0.006	0.00595	0.0002	0.00007	0.029	4.43E-07	4.92	0.08
2	Vinyl chloride (c)	ug/m3	3.01	MG/M3	0.0030						5.01E-04		91.89
3	1,1,1-Trichloroethane	ug/m3	16.89	MG/M3	0.0169	0.2857		0.0046	0.00198	0.016		2.81	
3	1,1-Dichloroethane	ug/m3	0.65	MG/M3	0.0006	0.14285		0.0002	0.00008	0.001		0.22	
3	1,2-Dichloroethane	ug/m3	0.53	MG/M3	0.0005		0.091	0.0001	0.00006		5.63E-06		3.15
3	Benzene	ug/m3	7.65	MG/M3	0.0076		0.02905	0.0021	0.00090		2.61E-05		14.58
3	Carbon tetrachloride	ug/m3	0.71	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00008	0.340	4.36E-06	59.01	2.44

Table B5-1
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Station ID	Chemical Name	Units	95%ile UCL	Calculated Units	Calculated value	Inhalation RFD[a] mg/kg-day	Inhalation SF[b] kg-day/mg	Intake - noncancer	Intake - cancer	Hazard Index	Cancer Risk	Percent of HI for Station	Percent of Risk for Station
3	Chlorobenzene	ug/m3	0.09	MG/M3	0.0001	0.005714		0.00003	0.00001	0.004		0.78	
3	Chloroform	ug/m3	0.50	MG/M3	0.0005	0.01	0.0805	0.0001	0.00006	0.014	4.69E-06	2.36	2.62
3	Ethylbenzene	ug/m3	4.63	MG/M3	0.0046	0.2857		0.0013	0.00054	0.004		0.77	
3	Tetrachloroethylene	ug/m3	4.40	MG/M3	0.0044	0.01	0.002	0.0012	0.00052	0.121	1.03E-06	20.91	0.58
3	Toluene	ug/m3	20.64	MG/M3	0.0206	0.11428		0.0057	0.00242	0.049		8.59	
3	Trichloroethylene	ug/m3	0.57	MG/M3	0.0006	0.006	0.00595	0.0002	0.00007	0.026	4.01E-07	4.55	0.22
3	Vinyl chloride (c)	ug/m3	0.82	MG/M3	0.0008						1.37E-04		76.41
4	1,1,1-Trichloroethane	ug/m3	18.53	MG/M3	0.0185	0.2857		0.0051	0.00218	0.018		2.64	
4	Benzene	ug/m3	9.76	MG/M3	0.0098		0.02905	0.0027	0.00115		3.33E-05		18.68
4	Carbon tetrachloride	ug/m3	0.78	MG/M3	0.0008	0.00057	0.0525	0.0002	0.00009	0.375	4.81E-06	55.73	2.70
4	Chlorobenzene	ug/m3	0.42	MG/M3	0.0004	0.005714		0.0001	0.00005	0.020		3.01	
4	Chloroform	ug/m3	0.55	MG/M3	0.0005	0.01	0.0805	0.0001	0.00006	0.015	5.16E-06	2.23	2.90
4	Ethylbenzene	ug/m3	14.53	MG/M3	0.0145	0.2857		0.0040	0.00171	0.014		2.07	
4	Tetrachloroethylene	ug/m3	5.01	MG/M3	0.0050	0.01	0.002	0.0014	0.00059	0.137	1.18E-06	20.41	0.66
4	Toluene	ug/m3	28.96	MG/M3	0.0290	0.11428		0.0079	0.00340	0.069		10.33	
4	Trichloroethylene	ug/m3	0.53	MG/M3	0.0005	0.006	0.00595	0.0001	0.00006	0.024	3.68E-07	3.58	0.21
4	Vinyl chloride (c)	ug/m3	0.80	MG/M3	0.0008						1.33E-04		74.86
5	1,1,1-Trichloroethane	ug/m3	16.70	MG/M3	0.0167	0.2857		0.0046	0.00196	0.016		2.63	
5	1,1-Dichloroethane	ug/m3	0.41	MG/M3	0.0004	0.14285		0.0001	0.00005	0.001		0.13	
5	1,2-Dichloroethane	ug/m3	0.21	MG/M3	0.0002		0.091	0.0001	0.00002		2.20E-06		4.31
5	Benzene	ug/m3	11.18	MG/M3	0.0112		0.02905	0.0031	0.00131		3.81E-05		74.72
5	Carbon tetrachloride	ug/m3	0.74	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00009	0.354	4.54E-06	58.23	8.90
5	Chloroform	ug/m3	0.50	MG/M3	0.0005	0.01	0.0805	0.0001	0.00006	0.014	4.69E-06	2.24	9.20
5	Ethylbenzene	ug/m3	5.53	MG/M3	0.0055	0.2857		0.0015	0.00065	0.005		0.87	
5	Tetrachloroethylene	ug/m3	4.57	MG/M3	0.0046	0.01	0.002	0.0013	0.00054	0.125	1.07E-06	20.60	2.11
5	Toluene	ug/m3	28.23	MG/M3	0.0282	0.11428		0.0077	0.00331	0.068		11.12	
5	Trichloroethylene	ug/m3	0.56	MG/M3	0.0006	0.006	0.00595	0.0002	0.00007	0.025	3.89E-07	4.18	0.76
6	1,1,1-Trichloroethane	ug/m3	17.25	MG/M3	0.0172	0.2857		0.0047	0.00203	0.017		2.73	

Table B5-1
Ambient Air Risk Calculations (Inhalation of Volatiles)
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Oil Landfill Feasibility Study Report

Station ID	Chemical Name	Units	95%ile UCL	Calculated Units	Calculated value	Inhalation RFD[a] mg/kg-day	Inhalation SF[b] kg-day/mg	Intake - noncancer	Intake - cancer	Hazard Index	Cancer Risk	Percent of HI for Station	Percent of Risk for Station
6	1,1-Dichloroethane	ug/m3	0.21	MG/M3	0.0002	0.14285		0.0001	0.00002	0.0004		0.07	
6	Benzene	ug/m3	8.67	MG/M3	0.0087		0.02905	0.0024	0.00102		2.96E-05		20.72
6	Carbon tetrachloride	ug/m3	0.73	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00009	0.350	4.49E-06	57.78	3.14
6	Chloroform	ug/m3	0.55	MG/M3	0.0005	0.01	0.0805	0.0001	0.00006	0.015	5.16E-06	2.47	3.62
6	Ethylbenzene	ug/m3	5.38	MG/M3	0.0054	0.2857		0.0015	0.00063	0.005		0.85	
6	Tetrachloroethylene	ug/m3	4.83	MG/M3	0.0048	0.01	0.002	0.0013	0.00057	0.132	1.13E-06	21.85	0.79
6	Toluene	ug/m3	24.66	MG/M3	0.0247	0.11428		0.0068	0.00290	0.059		9.77	
6	Trichloroethylene	ug/m3	0.59	MG/M3	0.0006	0.006	0.00595	0.0002	0.00007	0.027	4.15E-07	4.48	0.29
6	Vinyl chloride (c)	ug/m3	0.61	MG/M3	0.0006						1.02E-04		71.44
7	1,1,1-Trichloroethane	ug/m3	16.37	MG/M3	0.0164	0.2857		0.0045	0.00192	0.016		2.71	
7	1,1-Dichloroethane	ug/m3	0.37	MG/M3	0.0004	0.14285		0.0001	0.00004	0.001		0.12	
7	Benzene	ug/m3	8.10	MG/M3	0.0081		0.02905	0.0022	0.00095		2.76E-05		8.80
7	Carbon tetrachloride	ug/m3	0.72	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00008	0.344	4.42E-06	59.32	1.41
7	Chlorobenzene	ug/m3	0.23	MG/M3	0.0002	0.005714		0.0001	0.00003	0.011		1.93	
7	Chloroform	ug/m3	0.60	MG/M3	0.0006	0.01	0.0805	0.0002	0.00007	0.016	5.63E-06	2.81	1.79
7	Ethylbenzene	ug/m3	4.45	MG/M3	0.0044	0.2857		0.0012	0.00052	0.004		0.73	
7	Tetrachloroethylene	ug/m3	4.14	MG/M3	0.0041	0.01	0.002	0.0011	0.00049	0.113	9.71E-07	19.53	0.31
7	Toluene	ug/m3	20.51	MG/M3	0.0205	0.11428		0.0056	0.00241	0.049		8.47	
7	Trichloroethylene	ug/m3	0.56	MG/M3	0.0006	0.006	0.00595	0.0002	0.00007	0.025	3.88E-07	4.37	0.12
7	Vinyl chloride (c)	ug/m3	1.65	MG/M3	0.0017						2.75E-04		87.57
8	1,1,1-Trichloroethane	ug/m3	20.81	MG/M3	0.0208	0.2857		0.0057	0.00244	0.020		3.21	
8	1,2-Dichloroethane	ug/m3	0.83	MG/M3	0.0008		0.091	0.0002	0.00010		8.83E-06		6.64
8	Benzene	ug/m3	12.22	MG/M3	0.0122		0.02905	0.0033	0.00143		4.17E-05		31.37
8	Carbon tetrachloride	ug/m3	0.72	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00008	0.347	4.45E-06	55.83	
8	Chlorobenzene	ug/m3	0.28	MG/M3	0.0003	0.005714		0.0001	0.00003	0.013		2.17	
8	Chloroform	ug/m3	0.50	MG/M3	0.0005	0.01	0.0805	0.0001	0.00006	0.014	4.69E-06	2.19	3.53
8	Ethylbenzene	ug/m3	5.21	MG/M3	0.0052	0.2857		0.0014	0.00061	0.005		0.80	
8	Tetrachloroethylene	ug/m3	5.02	MG/M3	0.0050	0.01	0.002	0.0014	0.00059	0.138	1.18E-06	22.17	0.89

Table B5-1
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Station ID	Chemical Name	Units	95%ile UCL	Calculated Units	Calculated value	Inhalation RFD[a] mg/kg-day	Inhalation SF[b] kg-day/mg	Intake - noncancer	Intake - cancer	Hazard Index	Cancer Risk	Percent of HI for Station	Percent of Risk for Station
8	Toluene	ug/m3	30.05	MG/M3	0.0301	0.11428		0.0082	0.00353	0.072		11.61	
8	Trichloroethylene	ug/m3	0.27	MG/M3	0.0003	0.006	0.00595	0.0001	0.00003	0.012	1.91E-07	2.01	0.14
8	Vinyl chloride (c)	ug/m3	0.43	MG/M3	0.0004						7.19E-05		54.08
9	1,1,1-Trichloroethane	ug/m3	17.60	MG/M3	0.0176	0.2857		0.0048	0.00207	0.017		2.90	
9	Benzene	ug/m3	7.77	MG/M3	0.0078		0.02905	0.0021	0.00091		2.65E-05		74.23
9	Carbon tetrachloride	ug/m3	0.74	MG/M3	0.0007	0.00057	0.0525	0.0002	0.00009	0.355	4.55E-06	61.02	12.74
9	Chlorobenzene	ug/m3	0.23	MG/M3	0.0002	0.005714		0.0001	0.00003	0.011		1.93	
9	Chloroform	ug/m3	0.35	MG/M3	0.0003	0.01	0.0805	0.0001	0.00004	0.010	3.29E-06	1.64	9.20
9	Ethylbenzene	ug/m3	4.44	MG/M3	0.0044	0.2857		0.0012	0.00052	0.004		0.73	
9	Tetrachloroethylene	ug/m3	4.09	MG/M3	0.0041	0.01	0.002	0.0011	0.00048	0.112	9.61E-07	19.29	2.69
9	Toluene	ug/m3	19.14	MG/M3	0.0191	0.11428		0.0052	0.00225	0.046		7.89	
9	Trichloroethylene	ug/m3	0.58	MG/M3	0.0006	0.006	0.00595	0.0002	0.00007	0.027	4.08E-07	4.59	1.14

(a) Reference Dose

(b) Slope Factor

(c) The Cogliano Method was used to estimate risks for vinyl chloride (see text).

Table B5-2
Station-Specific Cancer and Hazard Index
Exposure Scenario for Residential Adult and Child
Oil Landfill Feasibility Study Report

	Total Risk			Total Hazard Index		
Station ID	Adult Average	Adult RME	Child RME	Adult Average	Adult RME	Child RME
Sample Stations						
1	4.83E-05	5.86E-04	3.91E-04	0.60	0.60	1.17
2	4.65E-05	5.46E-04	3.63E-04	0.59	0.59	1.14
3	2.08E-05	1.79E-04	1.17E-04	0.58	0.58	1.12
4	2.14E-05	1.78E-04	1.16E-04	0.67	0.67	1.31
5	1.46E-05	5.10E-05	2.98E-05	0.61	0.61	1.18
6	1.83E-05	1.43E-04	9.24E-05	0.61	0.61	1.18
7	2.81E-05	3.14E-04	2.08E-04	0.58	0.58	1.13
Background Stations						
8	2.19E-05	1.33E-04	8.40E-05	0.62	0.62	1.21
9	1.04E-05	3.57E-05	2.08E-05	0.58	0.58	1.13

media (e.g., air and soil). Typically, as an initial step, the risks across various media for the same population are simply added together. If this indicates a significantly higher risk than the single media estimates alone, it may be appropriate to evaluate the multipathway risks across media in more detail. This would involve breaking the risks down to specific pathways and impacted organs.

As an example at OII Landfill, under current conditions, potential risks to children adjacent to the landfill in the Iguala Park area include exposure to contaminated soil and air. Table B.2-4 illustrates the results of adding together the risk estimates from these two media.

Table B.2-4
Multipathway Risks Across Media
Child Reasonable Maximum Exposure Conditions in Iguala Park
OII Landfill Feasibility Study Report

Exposure Pathway	Cancer Risk	Noncancer Hazard Index
Ambient Air- Average of Stations 1, 2 and 3	2.90×10^{-4}	1.14
Surface Soil	5.3×10^{-5}	1.76
Totals:	**3.43×10^{-4}**	**2.9**

The cancer risks essentially remain unchanged in this example. The noncancer hazard index increases; but, given that the increase is not large and that all pathways and organs are combined together, this change probably does not represent a significant change in actual risk. Groundwater risks are not included in this evaluation because under current conditions, groundwater in the landfill vicinity is not being used. Thus, the exposure pathway is not complete. Under future exposure scenarios, groundwater could potentially be used; however, the air and soil pathways would likely have been addressed by the landfill cover. Thus, multipathway risks across media are not likely to occur under future conditions. The groundwater risks alone, as presented in Appendix B, likely represent the maximum potential risks.

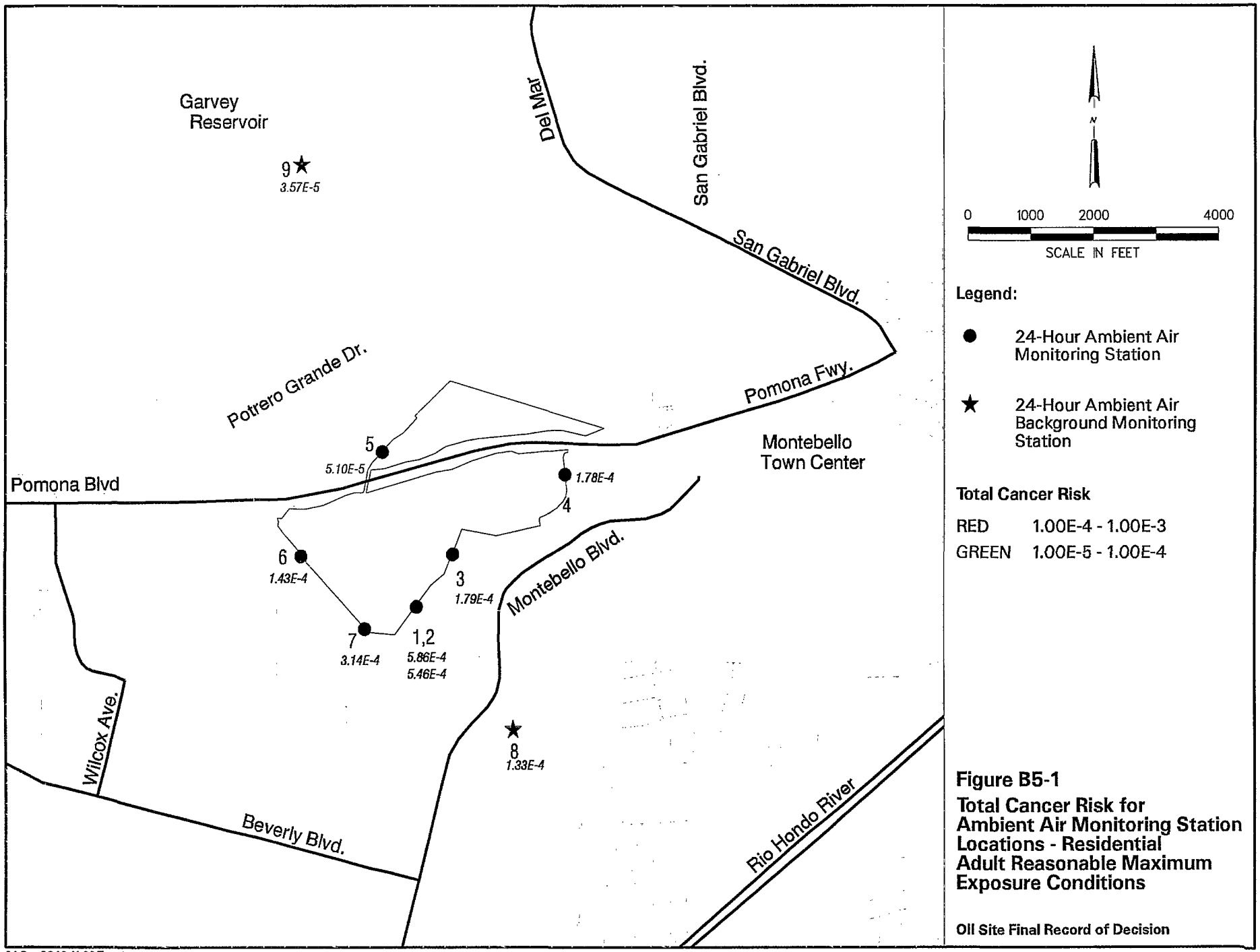

Figure B5-1
Total Cancer Risk for Ambient Air Monitoring Station Locations - Residential Adult Reasonable Maximum Exposure Conditions

Oil Site Final Record of Decision

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